

**ENGINEERING HANDBOOK**  
for  
**WORK UNIT STAFFS**

**Appendix No. 2**

**STANDARD STRUCTURAL PLANS**

**U.S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE  
LINCOLN, NEBRASKA**

# INDEX OF DRAWINGS FOR INCLUSION IN APPENDIX NO. 2

## ENGINEERING HANDBOOK FOR WORK UNIT STAFFS

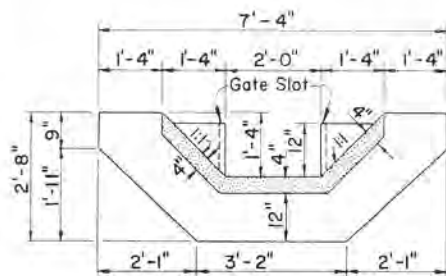
TYPE OF STRUCTURE		DRAWING NO.
TRAPEZOIDAL CHUTE DROP		
d = 12"	H = 0'-6"	5,0-19,000.1-1
d = 12"	H = 0'-9"	5,0-19,000.1-2
d = 12"	H = 1'-0"	5,0-19,000.1-3
d = 12"	H = 1'-6"	5,0-19,000.1-4
d = 12"	H = 2'-0"	5,0-19,000.1-5
d = 12"	H = 2'-6"	5,0-19,000.1-6
d = 12"	H = 3'-0"	5,0-19,000.1-7
d = 1'-2"	H = 1'-0" & 1'-6"	5,0-19,000.1-8
d = 1'-2"	H = 2'-0" to 4'-0"	5,0-19,000.1-9
d = 1'-4"	H = 1'-0" to 4'-0"	5,0-19,000.1-10
d = 1'-6"	H = 2'-0" to 3'-6"	5,0-19,000.1-11
CONCRETE DRIVE-THRU IRRIGATION DROP		
d = 12"	H = 0'-6"	5,0-19,000.2-1
d = 12"	H = 1'-0"	5,0-19,000.2-2
d = 12"	H = 1'-6"	5,0-19,000.2-3
d = 12"	H = 2'-0"	5,0-19,000.2-4
CONCRETE BLOCK DRIVE-THRU IRRIGATION DROP		
d = 12"	H = 1'-0"	5,0-19,000.3-1
d = 12"	H = 1'-4"	5,0-19,000.3-2
d = 12"	H = 1'-8"	5,0-19,000.3-3
d = 12"	H = 2'-0"	5,0-19,000.3-4
VERTICAL TRAPEZOIDAL DROP		
d = 12"	H = 1'-0" to 2'-6"	5,0-19,000.4-1
VERTICAL TRAPEZOIDAL DROP WITH CONCRETE BLOCK HEADWALL		
d = 12"	H = 0'-6"	5,0-19,000.5-1
d = 12"	H = 1'-0"	5,0-19,000.5-2
d = 12"	H = 1'-6"	5,0-19,000.5-3
CONCRETE VERTICAL DROP FOR NONCOHESIVE SOILS		
d = 12"	H = 0'-6"	5,0-19,000.6-1
d = 12"	H = 1'-0"	5,0-19,000.6-2
d = 12"	H = 1'-6"	5,0-19,000.6-3
d = 12"	H = 2'-0"	5,0-19,000.6-4
d = 12"	H = 2'-6"	5,0-19,000.6-5



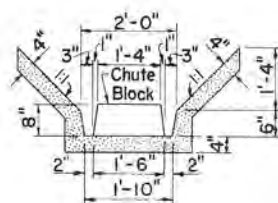
TYPE OF STRUCTURE	DRAWING NO.
CONCRETE VERTICAL DROP FOR NONCOHESIVE SOILS, (CONTD.)	
d = 12"                      H = 3'-0"	5,0-19,000.6-6
d = 18"                      H = 1'-0"	5,0-19,000.6-7
CONCRETE BLOCK VERTICAL DROP FOR NONCOHESIVE SOILS	
d = 12"                      H = 1'-0"	5,0-19,000.7-1
d = 12"                      H = 1'-8"	5,0-19,000.7-2
d = 12"                      H = 2'-4"	5,0-19,000.7-3
CONCRETE VERTICAL DROP FOR COHESIVE SOILS	
d = 12"                      H = 0'-6"	5,0-19,000.8-1
d = 12"                      H = 1'-0"	5,0-19,000.8-2
d = 12"                      H = 1'-6"	5,0-19,000.8-3
CONCRETE BLOCK VERTICAL DROP FOR COHESIVE SOILS	
d = 12"                      H = 1'-0"	5,0-19,000.9-1
d = 12"                      H = 1'-8"	5,0-19,000.9-2
VERTICAL WOOD DROP	
d = 8"                      H = 1'-0" to 2'-0"	5,0-19,000.10-1
d = 12"                      H = 2'-0" to 2'-6"	5,0-19,000.10-2
CORRUGATED METAL PIPE DROP	
(All with H = 1'-0" to 3'-0")	
d = 12"	5,0-19,000.11-1
d = 15"	5,0-19,000.11-2
d = 12" with check inlet	5,0-19,000.11-3
d = 15" with check inlet	5,0-19,000.11-4
CONCRETE TRAPEZOIDAL DIVISION BOX	
d = 12"                      B = 1'-0" to 2'-0"	5,0-19,000.12-1
d = 1'-2"                      B = 1'-0" to 2'-0"	5,0-19,000.12-2
d = 1'-4"                      B = 1'-0" to 2'-0"	5,0-19,000.12-3
d = 1'-6"                      B = 1'-0" to 3'-0"	5,0-19,000.12-4
d = 1'-2"                      B = 1'-6"	5,0-19,000.12-5
CONCRETE RECTANGULAR DIVISION BOX	
Two Way	5,0-19,000.13-1
Three Way	5,0-19,000.13-2

TYPE OF STRUCTURE		DRAWING NO.
WOOD DIVISION BOX		
Two Way		5,0-19,000.14-1
Three Way		5,0-19,000.14-2
CONCRETE CHECK		
d = 12"	B = 1'-6"	5,0-19,000.15-1
d = 12"	B = 2'-0"	5,0-19,000.15-2
d = 12"	B = 2'-6"	5,0-19,000.15-3
WOOD CHECK		
d = 12"	B = 2'-6" to 3'-6"	5,0-19,000.16-1
CONCRETE TURNOUT		
d = 12"	B = 1'-6"	5,0-19,000.17-1
d = 12"	B = 2'-0"	5,0-19,000.17-2
WOOD TURNOUT		
d = 12"	B = 2'-6" to 3'-6"	5,0-19,000.18-1
CORRUGATED METAL PIPE TURNOUT		
12" Dia.		5,0-19,000.19-1
15" Dia.		5,0-19,000.19-2
IRRIGATION WATER DESILTING BOX AND TRASH SCREEN		
Capacity to 450 G.P.M.		5,0-19,000.20-1
Capacity to 900 G.P.M.		5,0-19,000.20-2
IRRIGATION WATER TRASH SCREEN		
Capacity to 900 G.P.M.		5,0-19,000.21-1
COMBINATION PUMP OUTLET AND DIVISION BOX		
d = 12"		5,0-19,000.22-1
d = 14"		5,0-19,000.22-2
d = 20"		5,0-19,000.22-3
GRAVITY INLET FOR CONCRETE PIPE		5,0-19,000.23-1
CONCRETE BLOCK GRAVITY INLET FOR BURIED PIPE LINES		5,0-19,000.24-1
LOW HEAD PUMP STAND FOR CONCRETE PIPE		5,0-19,000.25-1

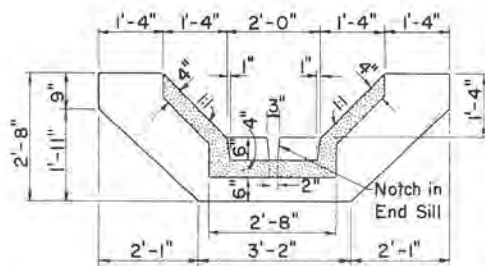
TYPE OF STRUCTURE	DRAWING NO.
HIGH HEAD STEEL TAPERED PUMP STAND FOR CONCRETE PIPE	5,0-19,000.26-1
HIGH HEAD NONTAPERED PUMP STAND FOR CONCRETE PIPE	5,0-19,000.27-1
CONCRETE PIPE SAND TRAP FOR CONCRETE PIPE LINE	5,0-19,000.28-1
OVERFLOW GATE STAND FOR CONCRETE PIPE LINES	5,0-19,000.29-1
ORCHARD VALVE OUTLET FOR CONCRETE PIPE LINES	5,0-19,000.30-1
ALFALFA VALVE OR MODIFIED ALFALFA VALVE OUTLET FOR CONCRETE PIPE LINES	5,0-19,000.31-1
NONBALANCED FLOAT VALVE STANDS FOR CONCRETE PIPE LINES	5,0-19,000.32-1
VENT FOR CONCRETE PIPE LINES	5,0-19,000.33-1
CONCRETE HEAD GATE STRUCTURE B = 3'-0" to 6'-0"	5,0-19,000.34-1
CONCRETE SIPHON INLET AND OUTLET 8" to 15" Dia. Pipe 16" to 24" Dia. Pipe	5,0-19,000.35-1 5,0-19,000.35-2
INLET AND OUTLET STRUCTURES FOR CONCRETE CHUTE Q = 3.0 C.F.S. to 5.0 C.F.S. (2 sheets)	5,0-19,000.36-1
SUBSTRUCTURE FOR METAL FLUMES	5,0-19,000.37-1
CONCRETE BLOCK DROP STRUCTURE FOR GULLY & TERRACE OUTLET CONTROL d = 2'-0" Drop = 3'-3½" to 4'-8½" (4 sheets)	5,0-19,000.38-1
REINFORCED CONCRETE DROP STRUCTURE FOR GULLY & TERRACE OUTLET CONTROL d = 1'-0" to 2'-6" Drop = 3'-0" to 5'-0" (2 sheets)	5,0-19,000.39-1



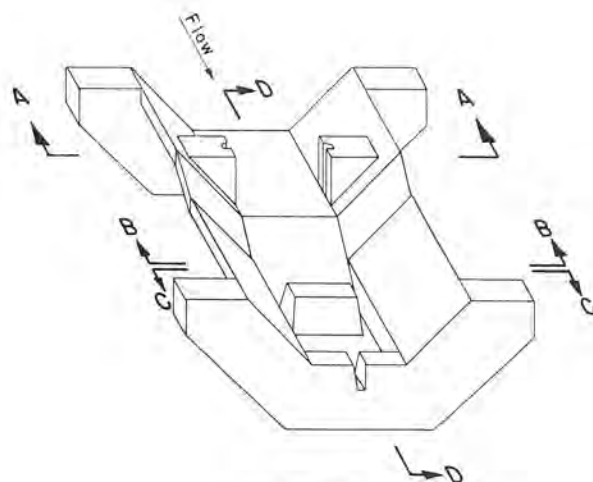
SECTIONAL ELEVATION A-A



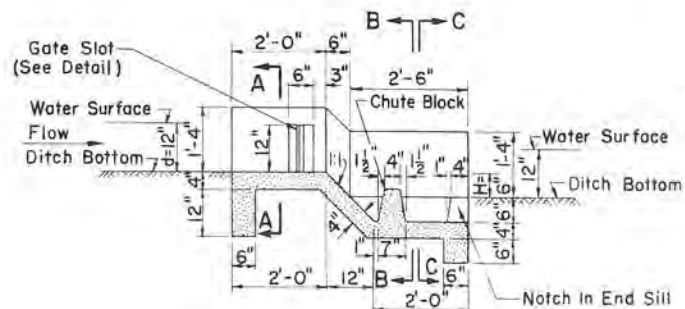
SECTION B-B  
(DETAIL OF CHUTE BLOCK)



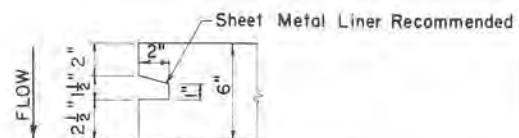
SECTIONAL ELEVATION C-C



OBLIQUE VIEW



SECTIONAL ELEVATION D-D



PLAN SHOWING GATE SLOT DETAIL

TABLE OF QUANTITIES

ITEM	AMOUNT
CONCRETE	0.77 CU.YDS.

NOMENCLATURE

d - DEPTH OF WATER IN DITCH  
H - HEIGHT OF FALL IN WATER SURFACE

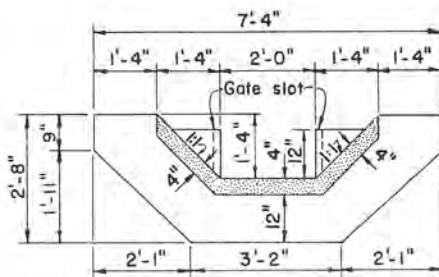
Q = 5.0 c.f.s.

TRAPEZOIDAL CHUTE DROP

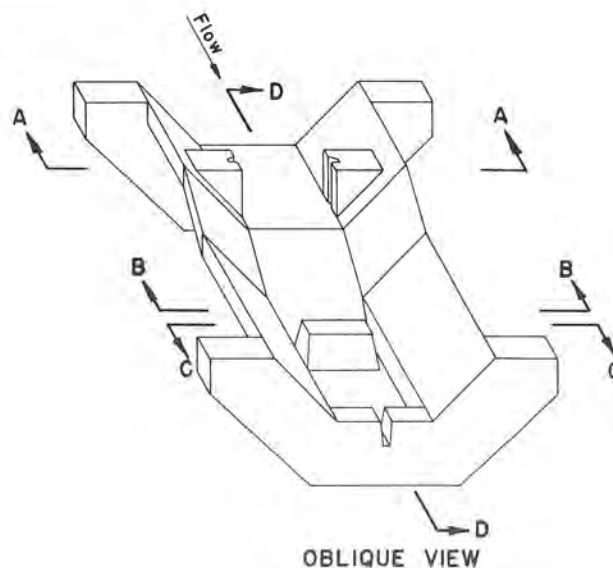
d = 12" H = 0'-6"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

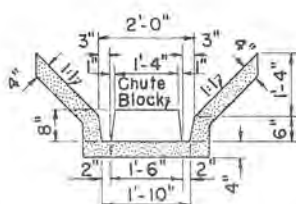
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.1-1



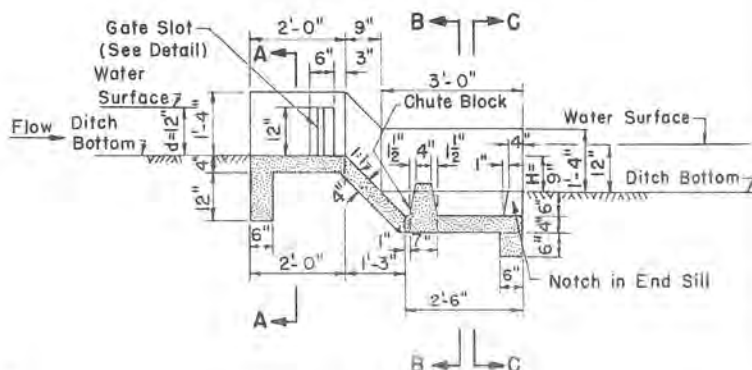
SECTIONAL ELEVATION A-A



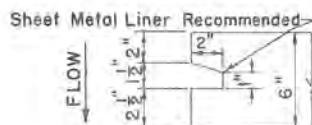
OBLIQUE VIEW



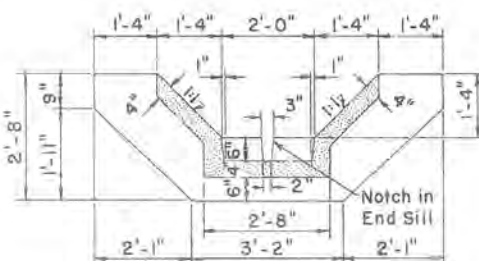
SECTION B-B  
(DETAIL OF CHUTE BLOCK)



SECTIONAL ELEVATION D-D



PLAN SHOWING GATE SLOT DETAIL



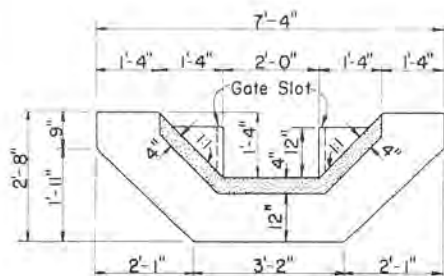
SECTIONAL ELEVATION C-C

TABLE OF QUANTITIES	
ITEM	AMOUNT
CONCRETE	0.84 CU.YDS.

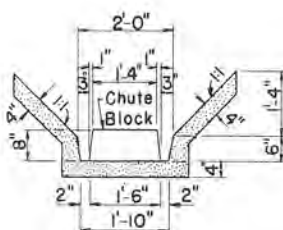
NOMENCLATURE  
d = DEPTH OF WATER IN DITCH  
H = HEIGHT OF FALL IN WATER SURFACE

Q = 5.7 c.f.s.

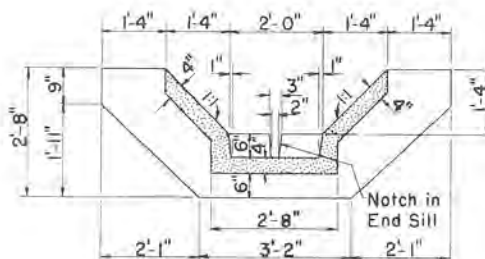
TRAPEZOIDAL CHUTE DROP			
d = 12 "		H = 0' - 9"	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5.0-19,000.1-2



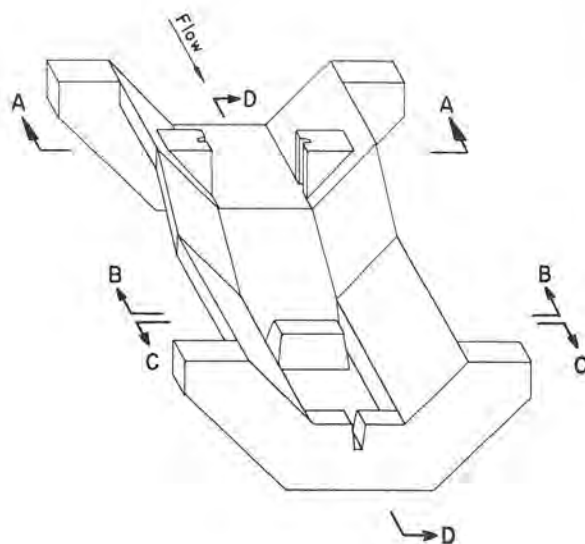
SECTIONAL ELEVATION A-A



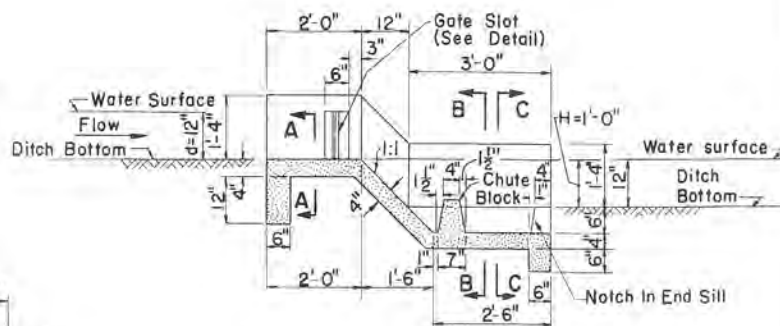
SECTION B-B  
(DETAIL OF CHUTE BLOCK)



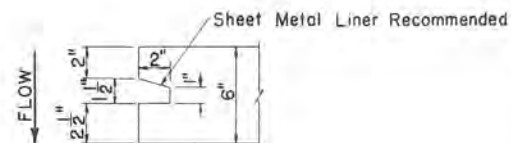
SECTIONAL ELEVATION C-C



OBLIQUE VIEW



SECTIONAL ELEVATION D-D



PLAN SHOWING GATE SLOT DETAIL

TABLE OF QUANTITIES

ITEM	AMOUNT
CONCRETE	0.36 CU.YDS.

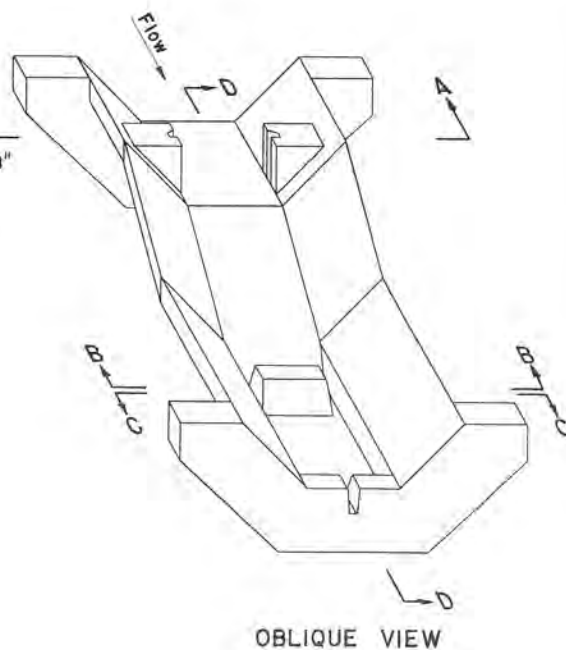
NOMENCLATURE

d = DEPTH OF WATER IN DITCH  
H = HEIGHT OF FALL IN WATER SURFACE

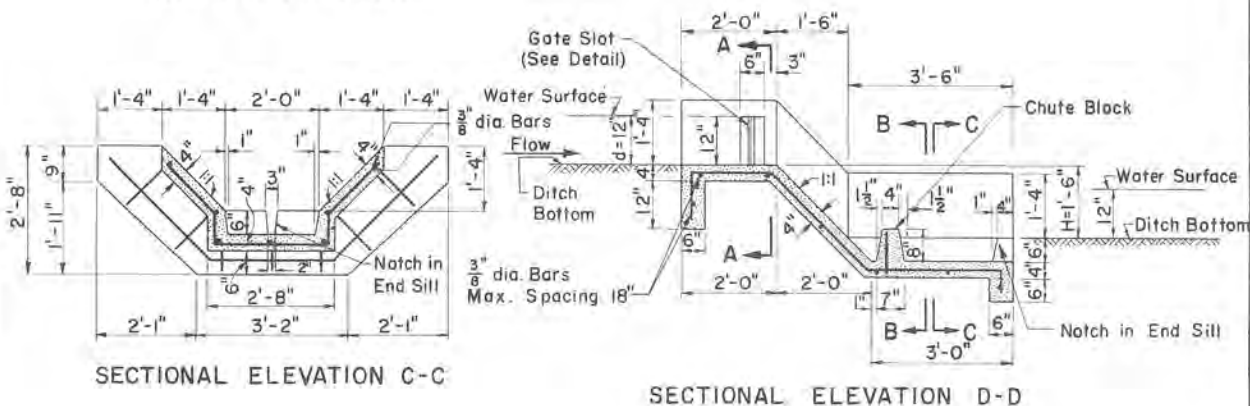
Q=6.0 c.f.s.

TRAPEZOIDAL CHUTE DROP			
d=12"		H=1' 0"	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.1-3



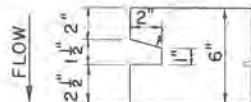


SECTION B-B  
(DETAIL OF CHUTE BLOCK)



SECTIONAL ELEVATION D-D

—Sheef Metal Liner Recommended



PLAN SHOWING GATE SLOT DETAIL

ITEM	DESCRIPTION	AMOUNT
CONCRETE		0.96 CU. YD.
REINFORCING STEEL	3/8" DIAMETER BARS	104 LIN. FT.

NOTE: 6" X 6" NO. 10 WIRE MESH  
MAY BE USED IN PLACE OF  
3/8" DIAMETER BARS

NOMENCLATURE

d - DEPTH OF WATER IN DITCH

H - HEIGHT OF FALL IN WATER SURFACE

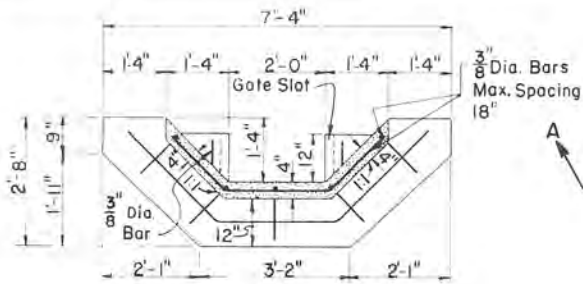
 $Q = 6.0 \text{ c.f.s.}$ 

## TRAPEZOIDAL CHUTE DROP

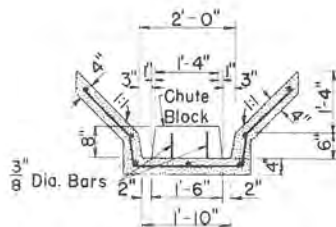
$$d = 12'' \qquad H = 1'-6''$$

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

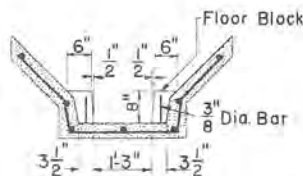
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	50-19,000.1-4



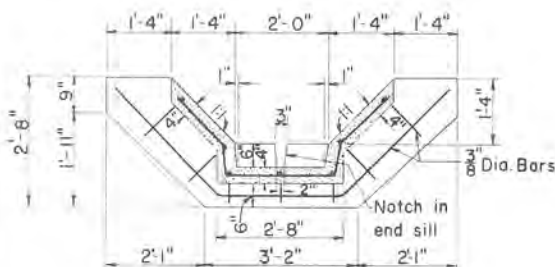
SECTIONAL ELEVATION A-A



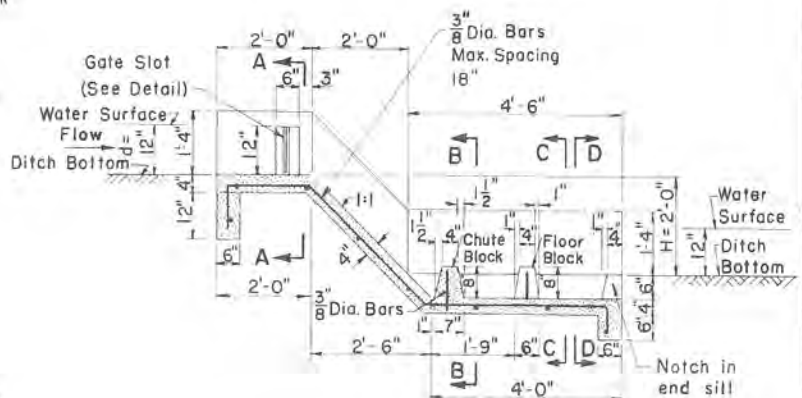
SECTION B-B  
(DETAIL OF CHUTE BLOCK)



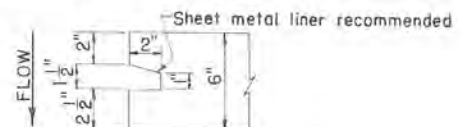
SECTION C-C  
(DETAIL OF FLOOR BLOCKS)



SECTIONAL ELEVATION D-D



SECTIONAL ELEVATION E-E



PLAN SHOWING GATE SLOT DETAIL

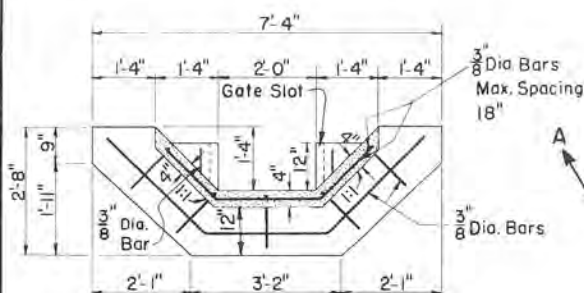
TABLE OF QUANTITIES		
ITEM	DESCRIPTION	AMOUNT
CONCRETE		1.1 CU. YDS.
REINFORCING STEEL	3/8" DIAMETER BARS	129 LIN. FT.

NOMENCLATURE  
 $\sigma$  - DEPTH OF WATER IN DITCH  
 $H$  - HEIGHT OF FALL IN WATER SURFACE

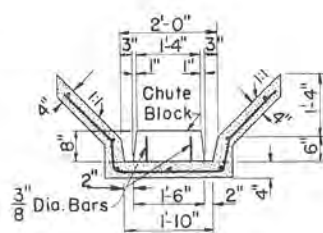
NOTE: 6" X 6" NO. 10 WIRE MESH  
 MAY BE USED IN PLACE OF  
 3/8" DIAMETER BARS

Q = 6.0 c.f.s.

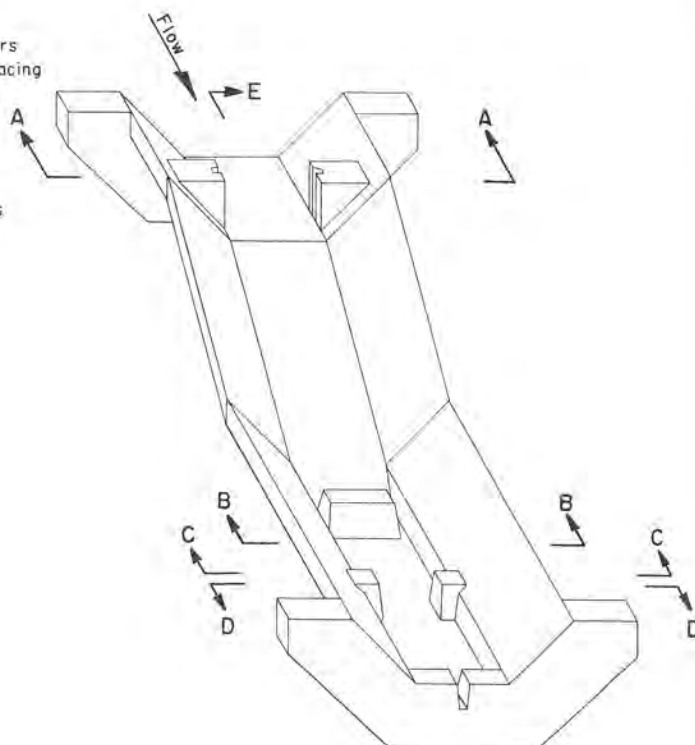
TRAPEZOIDAL CHUTE DROP			
d = 12"		H = 2'-0"	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.1-5



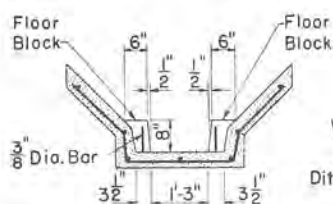
SECTIONAL ELEVATION A-A



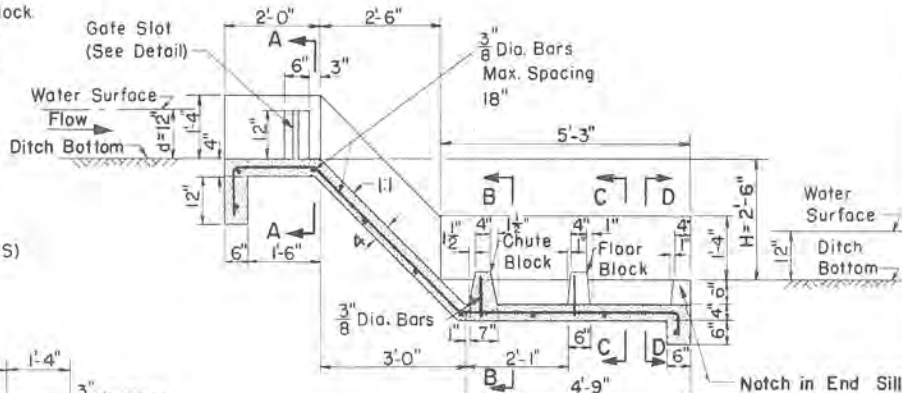
SECTION B-B  
(DETAIL OF CHUTE BLOCK)



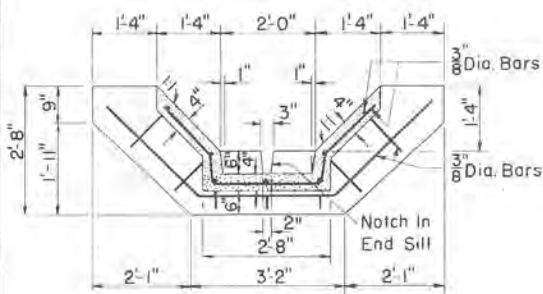
OBLIQUE VIEW



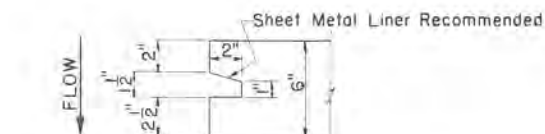
SECTION C-C  
(DETAIL OF FLOOR BLOCKS)



SECTIONAL ELEVATION E-E



SECTIONAL ELEVATION D-D



PLAN SHOWING GATE SLOT DETAIL

NOTE: 6" X 6" NO. 10 WIRE MESH  
MAY BE USED IN PLACE OF  
3/8" DIAMETER BARS

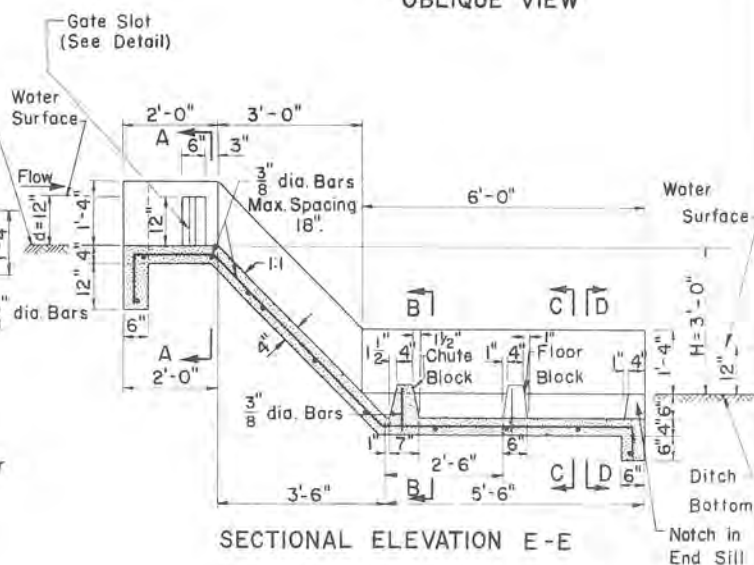
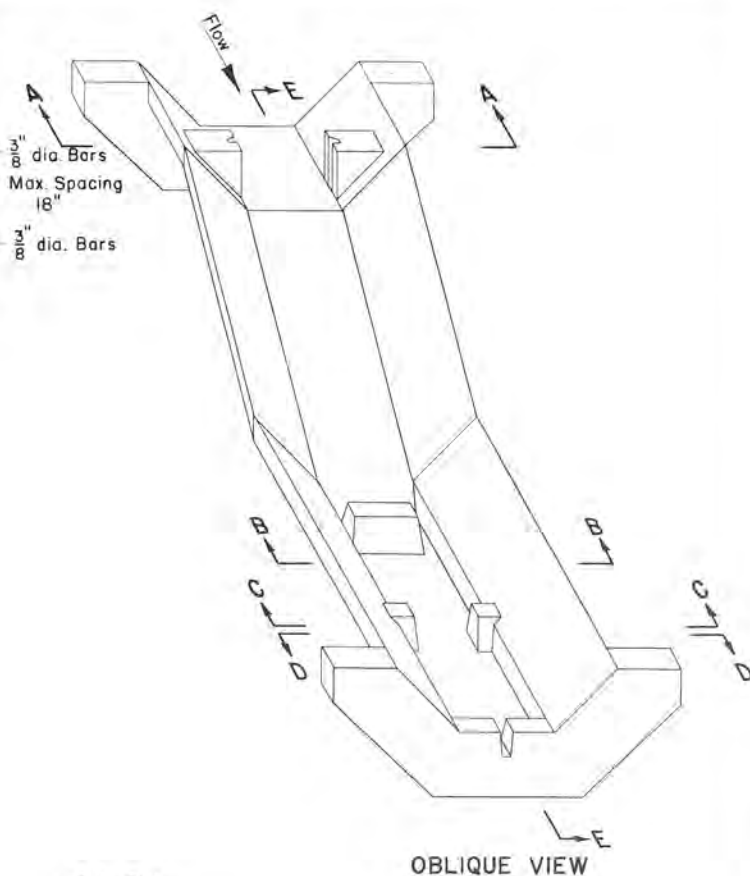
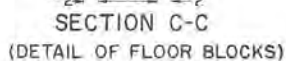
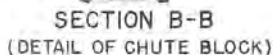
Q = 6.0 c.f.s.

TABLE OF QUANTITIES		
ITEM	DESCRIPTION	AMOUNT
CONCRETE		1.21 CU. YDS.
REINFORCING STEEL	3/8" DIAMETER BARS	144 LIN. FT.

#### NOMENCLATURE

d = DEPTH OF WATER IN DITCH  
H = HEIGHT OF FALL IN WATER SURFACE

TRAPEZOIDAL CHUTE DROP			
d=12"		H=2'-6"	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5.0-19,000.1-6



## NOMENCLATURE

d - DEPTH OF WATER IN DITCH  
H - HEIGHT OF FALL IN WATER SURFACE

NOTE: 5" X 6" NO. 10 WIRE MESH  
MAY BE USED IN PLACE OF  
3/8" DIAMETER BARS

ITEM	DESCRIPTION	AMOUNT
CONCRETE		1.33 CU.YDS.
REINFORCING STEEL	3/8" DIAMETER BARS	157 LIN.FT.

 $Q = 6.0 \text{ c.f.s.}$ 

## TRAPEZOIDAL CHUTE DROP

 $d = 12''$  $H = 3' - 0''$ U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPTON

CHICKO

DATE  
1-64

DRAWING NO.  
5.0-19.000.1-7





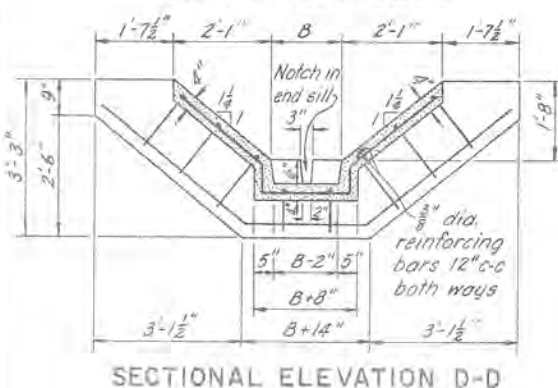
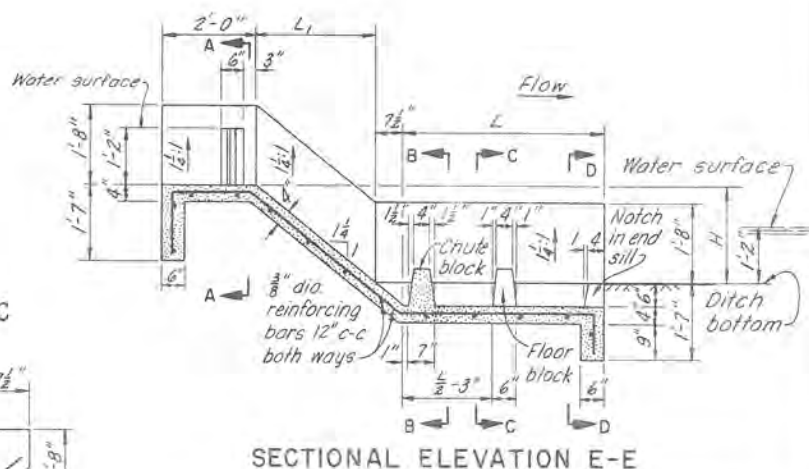
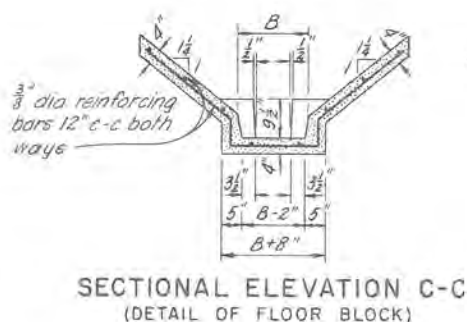
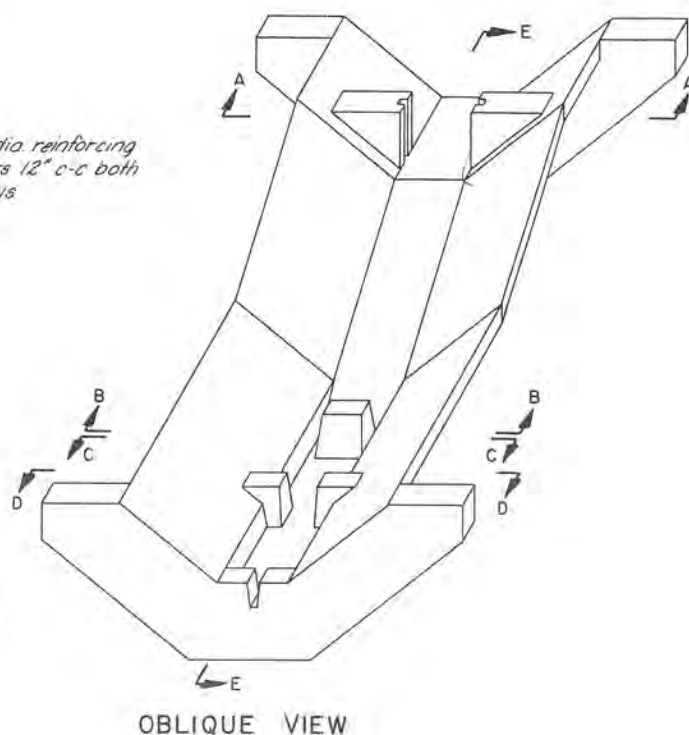
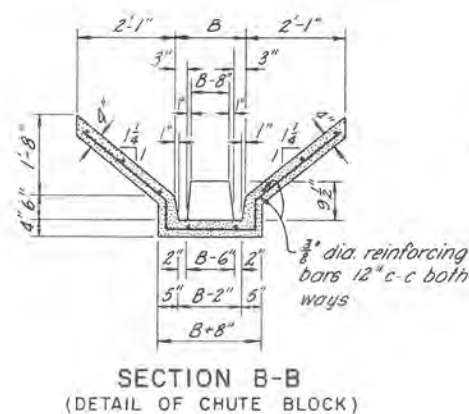
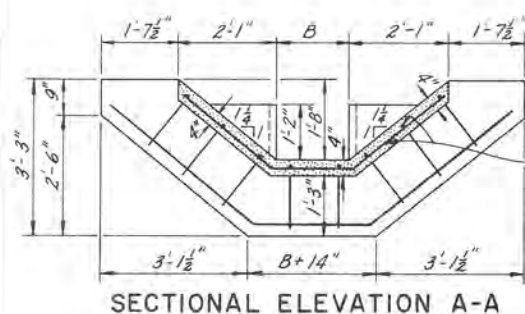
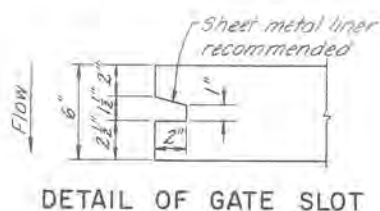


TABLE OF DIMENSIONS AND QUANTITIES

H	L	L <sub>1</sub>	B=1'-6", Q=5.3 c.f.s.		B=2'-0", Q=7.4 c.f.s.	
			Concrete Cu. Yds.	Steel Lin. Ft.	Concrete Cu. Yds.	Steel Lin. Ft.
2'-0"	4'-3"	3'-1 1/2"	1.39	181	1.48	187
2'-6"	5'-0"	3'-9"	1.52	202	1.62	208
3'-0"	5'-9"	4'-4 1/2"	1.65	228	1.76	235
3'-6"	6'-6"	5'-0"	1.78	254	1.90	263
4'-0"	7'-3"	5'-7 1/2"	1.91	279	2.04	288

- Notes: 1. Reinforcement to be placed in center of slabs  
 2. 6" x 6" No 10 wire mesh may be used in place of 3/8" diameter reinforcing bars  
 3. Nomenclature:  
 d = depth of water in ditch  
 H = height of fall in water surface  
 B = bottom width of drop channel

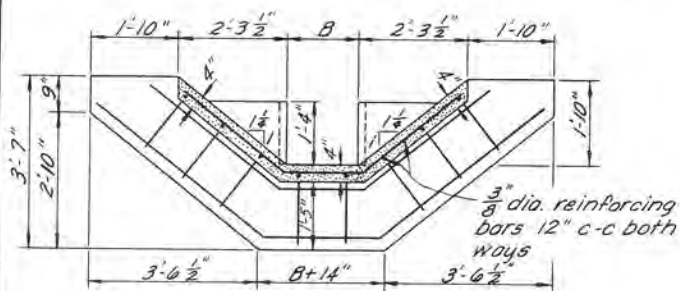


TRAPEZOIDAL CHUTE DROP

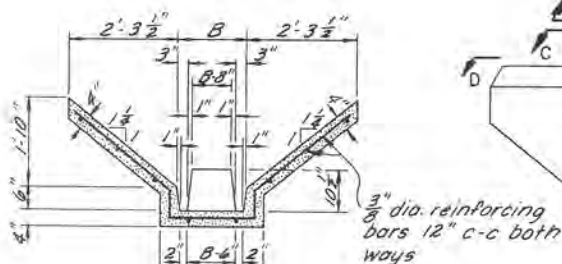
d=1'-2", H=2'-0" to 4'-0" incl., B=1'-6" & 2'-0"

U. S. DEPARTMENT OF AGRICULTURE  
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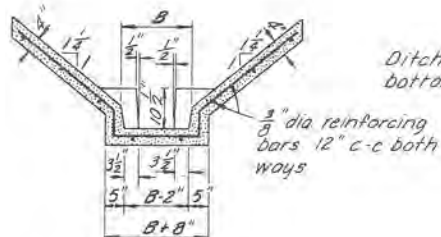
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		1-64	5,0-19,000.1-9



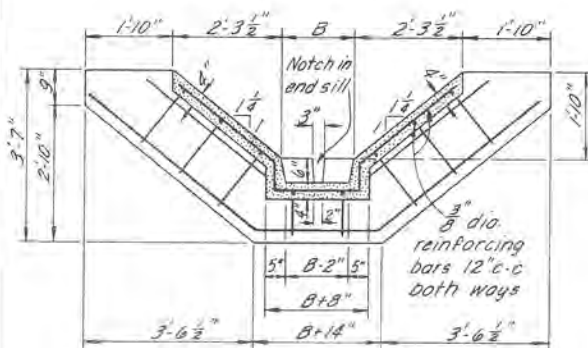
SECTIONAL ELEVATION A-A



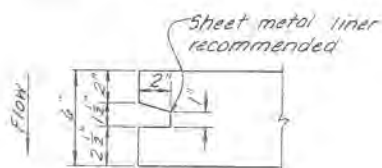
SECTION B-B  
(DETAIL OF CHUTE BLOCK)



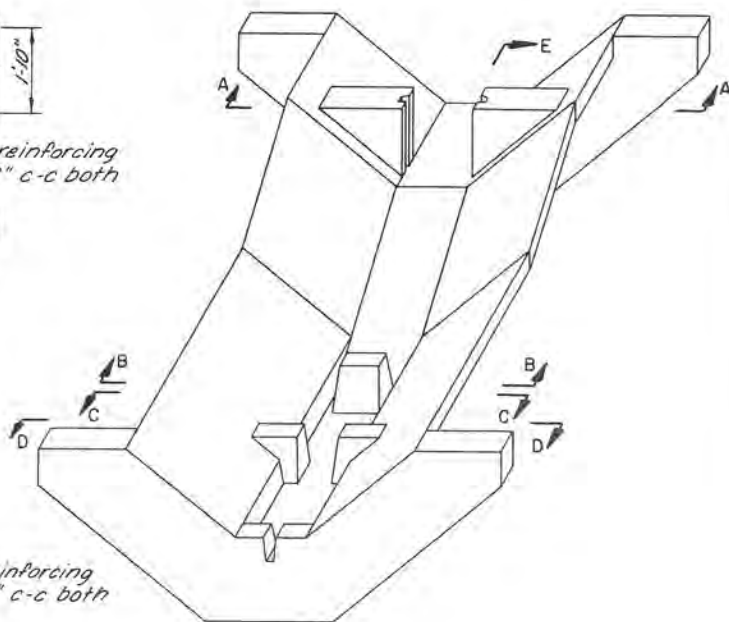
SECTION C-C  
(DETAIL OF FLOOR BLOCK)



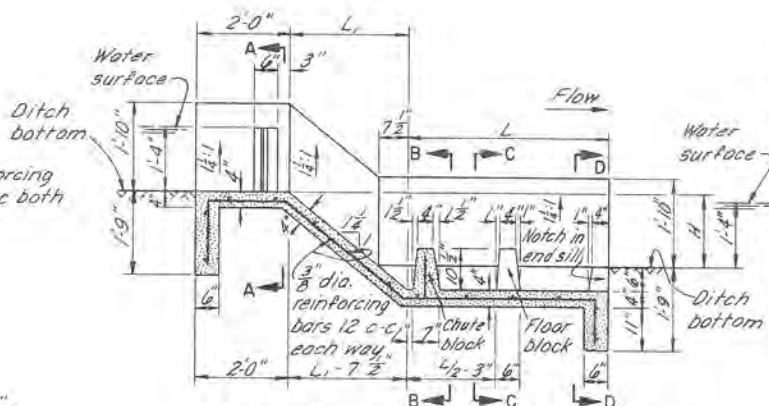
SECTIONAL ELEVATION D-D



DETAIL OF GATE SLOT



OBLIQUE VIEW



SECTIONAL ELEVATION E-E  
TABLE OF DIMENSIONS AND QUANTITIES

H	L	L <sub>1</sub>	B=1'-6", Q=6.3 cfs.		B=2'-0", Q=8.8 cfs.	
			Concrete Cu. Yd.	Steel Lin. Ft.	Concrete Cu. Yd.	Steel Lin. Ft.
1'-0"	4'-0"	1'-10 1/2"	1.41	164	1.50	169
1'-6"	4'-3"	2'-6"	1.50	178	1.59	183
2'-0"	4'-6"	3'-1 1/2"	1.59	193	1.68	199
2'-6"	5'-6"	3'-9"	1.75	215	1.86	222
3'-0"	6'-3"	4'-4 1/2"	1.89	239	2.01	246
3'-6"	7'-0"	5'-0"	2.03	270	2.16	278
4'-0"	7'-9"	5'-7 1/2"	2.17	297	2.31	307

Notes:

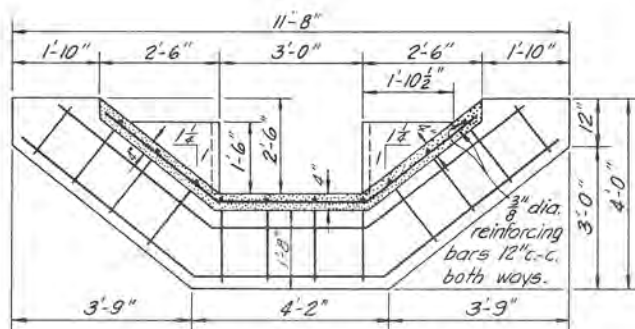
1. Reinforcement to be placed in center of slabs.
2. 6"x6" No. 10 wire mesh may be used in place of 3/8" dia reinforcing bars.
3. Nomenclature:  
d = depth of water in ditch.  
H = height of fall in water surface.  
B = bottom width of drop.

TRAPEZOIDAL CHUTE DROP

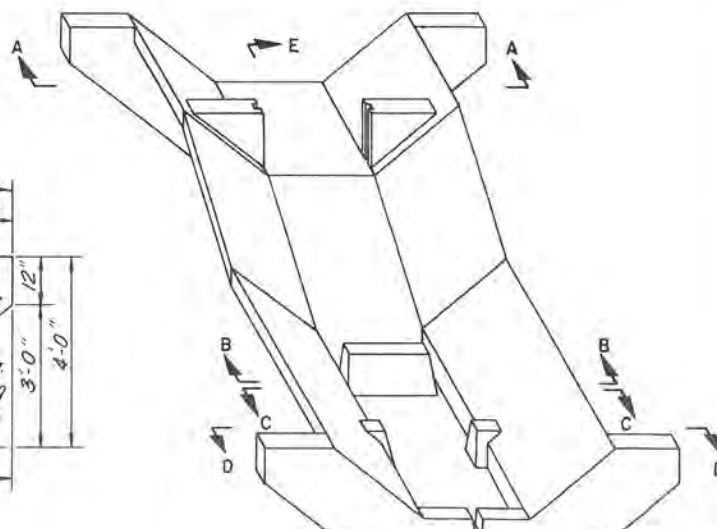
d=1'-4", H=1'-0" to 4'-0" incl. B=1'-6" & 2'-0"

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SOIL CONSERVATION SERVICE

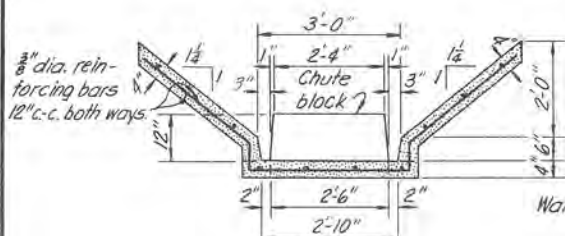
COMPILED	CHIEF	DATE	DRAWING NO.
		1-64	5,0-19,000,1-10



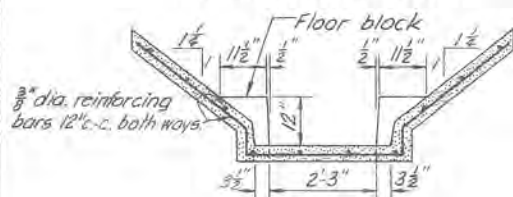
SECTIONAL ELEVATION A-A



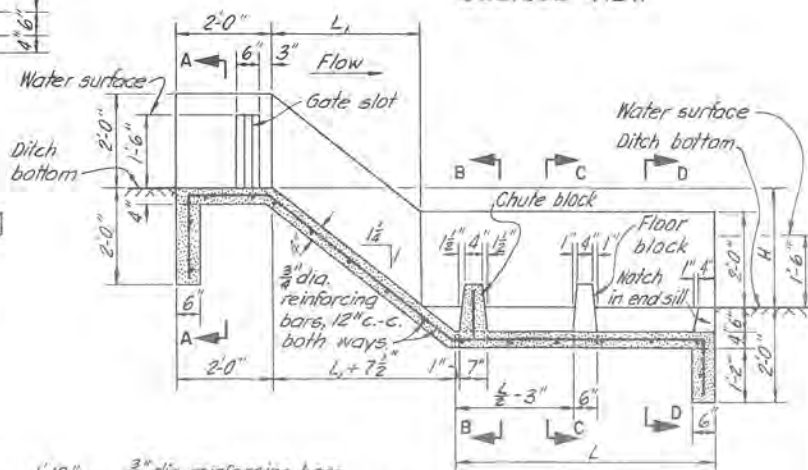
OBLIQUE VIEW



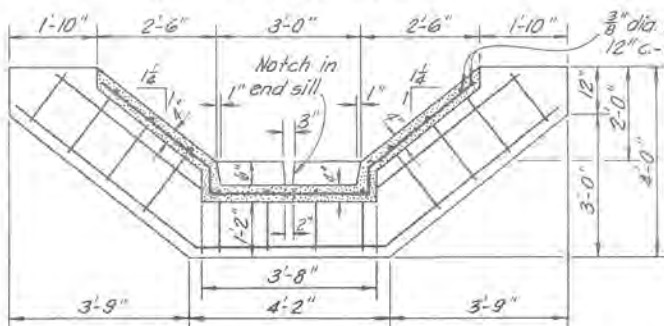
SECTION B-B  
(DETAIL OF CHUTE BLOCK)



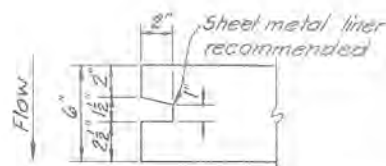
SECTION C-C  
(DETAIL OF FLOOR BLOCKS)



SECTIONAL ELEVATION E-E



SECTIONAL ELEVATION D-D



DETAIL OF GATE SLOT

TABLE OF  
DIMENSIONS AND QUANTITIES

H	L	L <sub>1</sub>	B=3'-0"	
			Q=16.5 c.f.s.	
			Concr.	Steel
			Cu. Yd.	Lin. Ft.
2'-0"	4'-6"	2'-6"	2.10	316
2'-6"	5'-6"	3'-1 1/2"	2.31	347
3'-0"	6'-3"	3'-9"	2.42	384
3'-6"	7'-0"	4'-4 1/2"	2.60	411

Q = Cap. of drop = 3.33(B-0.2d)d<sup>3/2</sup> c.f.s.

- Notes: 1. Reinforcement to be placed in center of slabs.  
2. 6" x 6" No. 10 wire mesh may be used in place of 3/8" dia. reinforcing bars.  
3. Nomenclature:  
d = depth of water in ditch.  
H = height of fall in water surfaces.  
B = bottom width of structure channel.

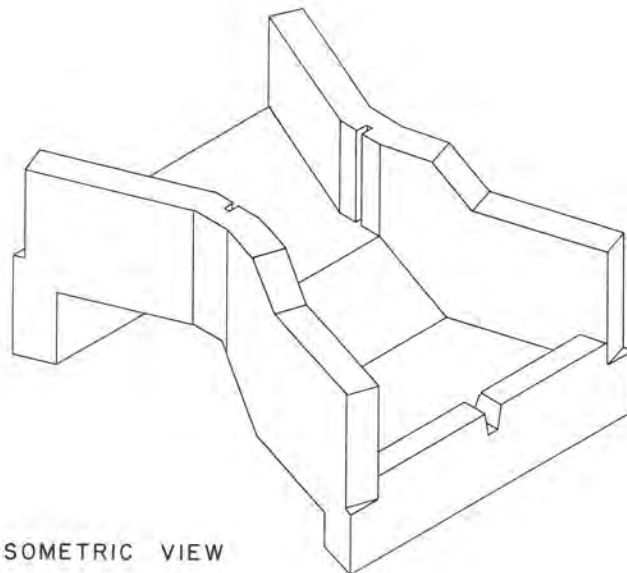
TRAPEZOIDAL CHUTE DROP

d=1'-6"; H=2'-0", 2'-6", 3'-0", 3'-6"; B=3'-0"

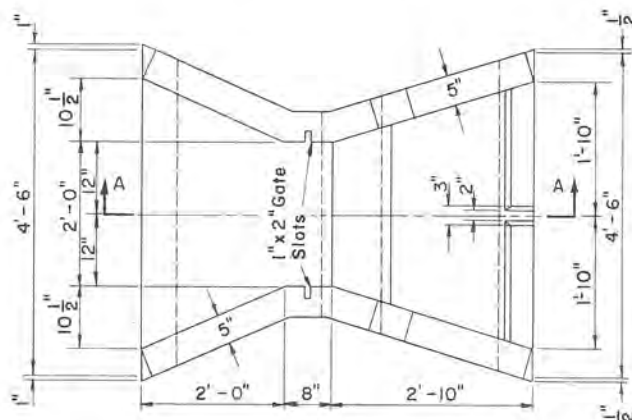
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	DRAWING NO.
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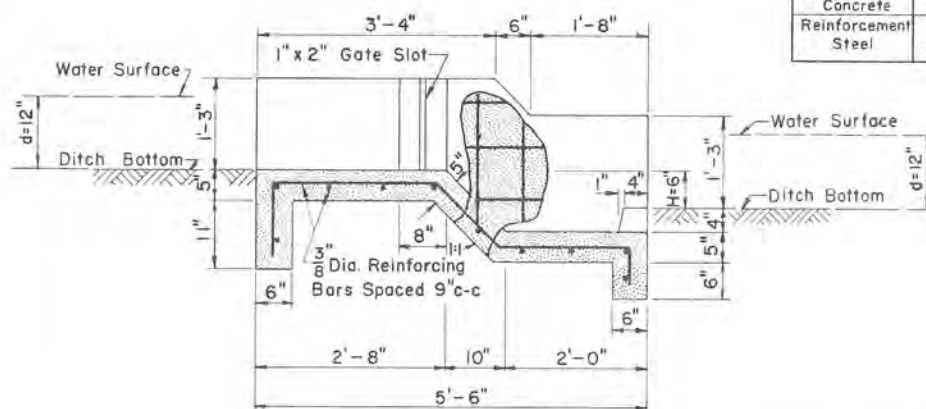


ISOMETRIC VIEW



PLAN

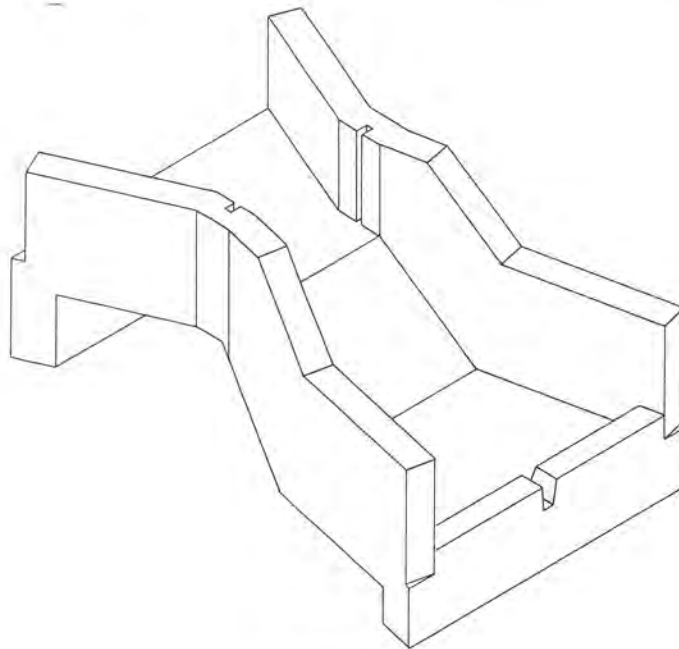
TABLE OF QUANTITIES		
ITEM	DESCRIPTION	AMOUNT
Concrete		0.72 Cu.Yd.
Reinforcement Steel	3/8" Dia. Bars	135 LIn.ft



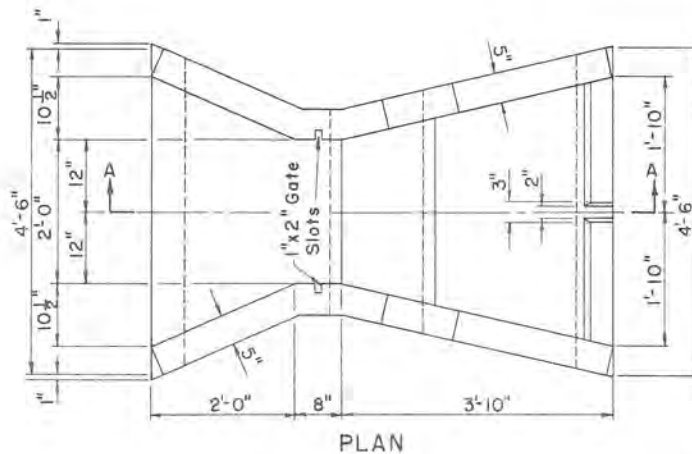
SECTIONAL ELEVATION A-A

Q = 5.0 c.f.s.

CONCRETE DRIVE - THRU IRRIGATION DROP			
d=12"		H=0'-6"	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5.0-19.000.2-1



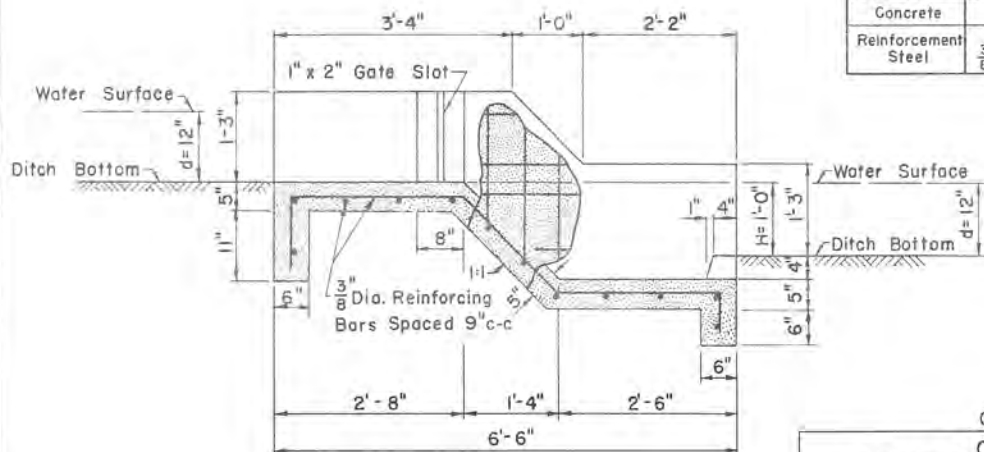
ISOMETRIC VIEW



PLAN

TABLE OF QUANTITIES

ITEM	DESCRIPTION	AMOUNT
Concrete		0.84 Cu.Yd.
Reinforcement Steel	6/8" Dia. Bars	148 Lin. ft.



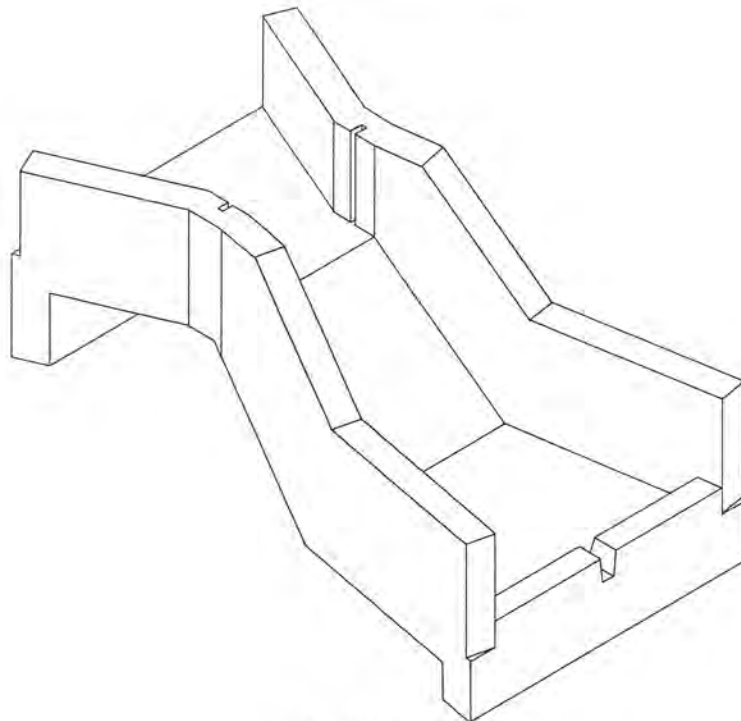
SECTIONAL ELEVATION A-A

Q = 6.0 c.f.s.

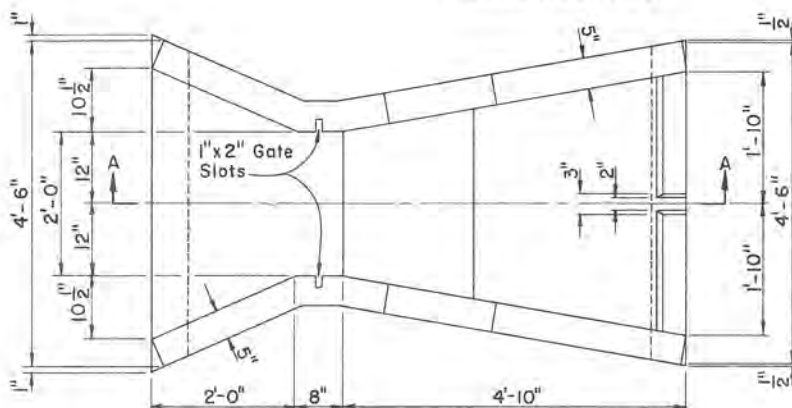
CONCRETE  
DRIVE-THRU IRRIGATION DROP  
d = 12" H = 1'-0"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	DRAWING NO.
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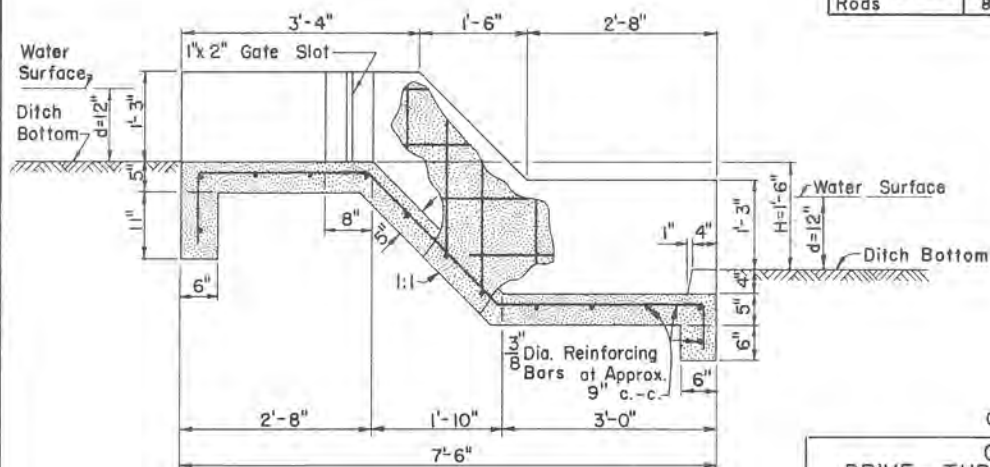
ISOMETRIC VIEW



PLAN

TABLE OF QUANTITIES

Item	Description	Amount
Concrete		0.96 Cu.Yd.
Reinforcement Rods	3/8" Dia. Bars	165 Lin. Ft.



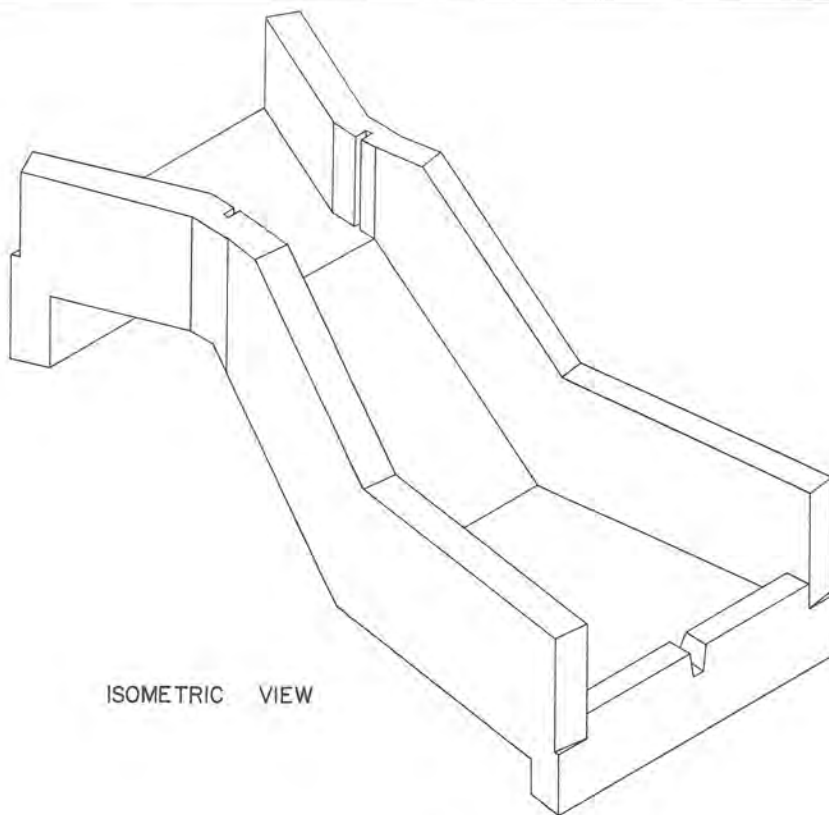
SECTIONAL ELEVATION A-A

Q = 6.0 c.f.s.

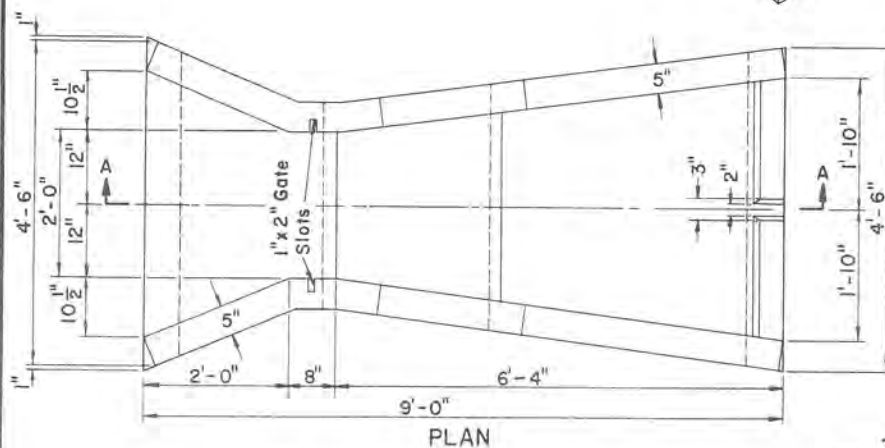
CONCRETE  
DRIVE - THRU IRRIGATION DROP  
d = 12" H = 1'-6"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

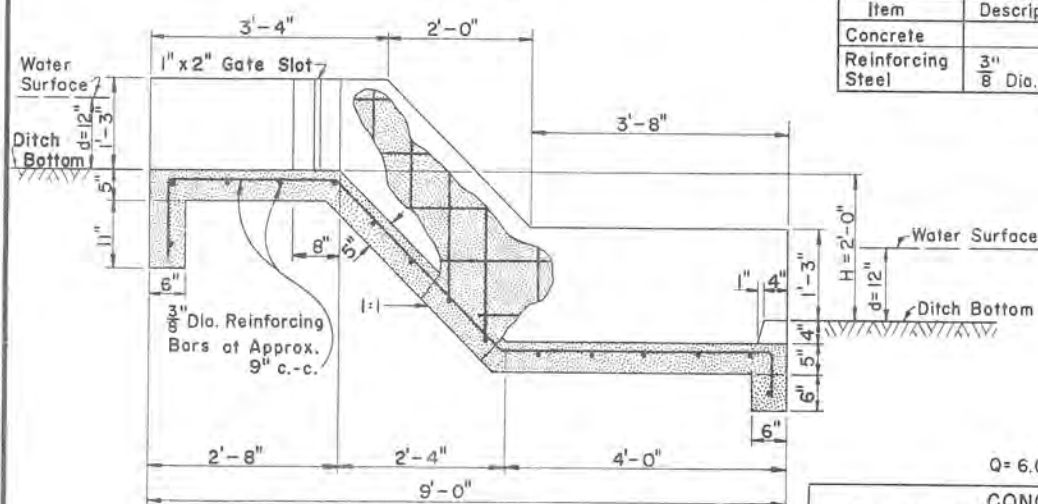
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.2-3



ISOMETRIC VIEW



PLAN



SECTIONAL ELEVATION A-A

TABLE OF QUANTITIES

Item	Description	Amount
Concrete		1.11 Cu. Yd.
Reinforcing Steel	3/8" Dia. Bars	195 Lin. Ft.

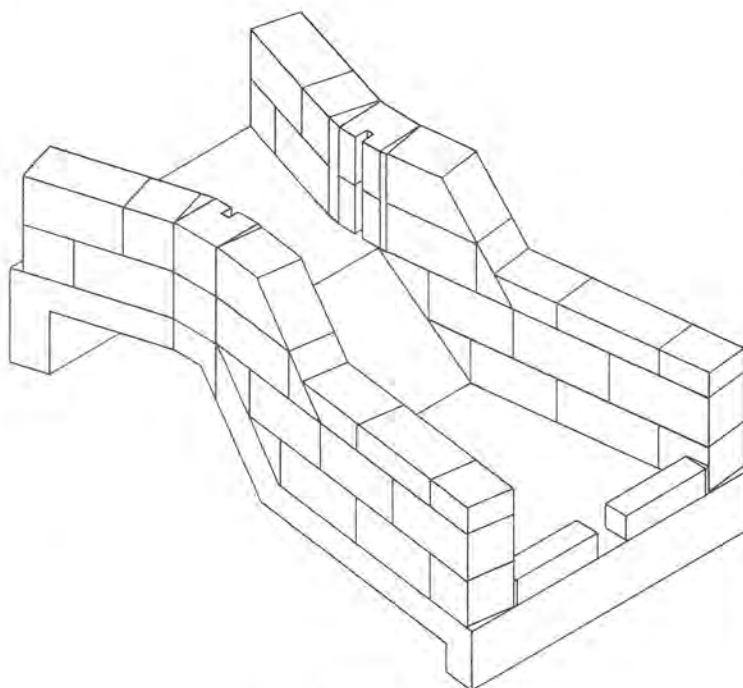
Q = 6.0 c.f.s.

CONCRETE  
DRIVE - THRU IRRIGATION DROP  
d = 12" H = 2'-0"

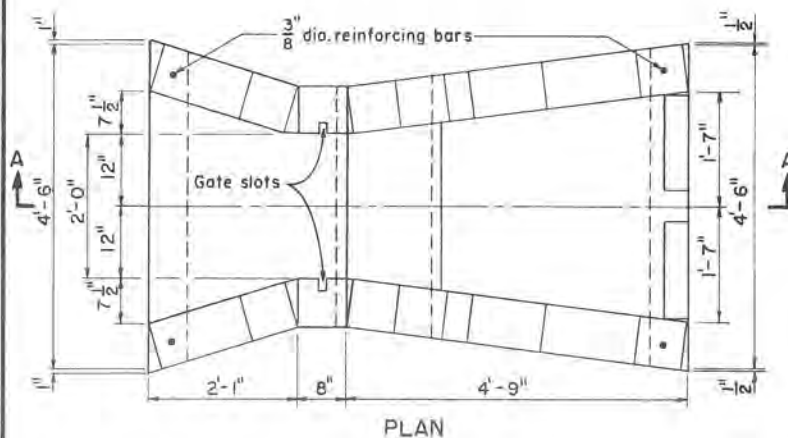
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

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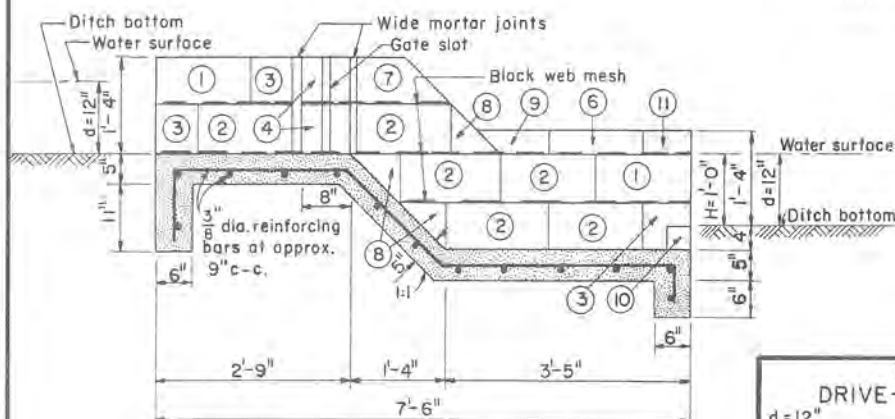




ISOMETRIC VIEW



PLAN



SECTIONAL ELEVATION A-A

# BILL OF MATERIAL

MARK	DESCRIPTION	UNIT	QUAN.
1	8"x8"x16", corner block.	Ea.	4
2	8"x8"x16", stretcher block.	Ea.	12
3	8"x8"x8", corner block.	Ea.	6
4	8"x8"x8", corner block with gate slot.	Ea.	4
5	Not used.		
6	4"x8"x16", stretcher block.	Ea.	2
7	8"x8"x16", stretcher block with a 45° end cut.	Ea.	2
8	1/4 of an 8"x8"x16", stretcher block with a 45° end cut.	Ea.	6
9	5/8 of a 4"x8"x16", stretcher block with a 45° end cut.	Ea.	2
10	4"x4"x16", corner block may replace usual concrete end sill.	Ea.	2
11	4"x8"x8", corner block.	Ea.	2
	CONCRETE		
	with concrete end sill	Cu.yd.	0.62
	with mark 10 blocks	Cu.yd.	0.60
	MORTAR	Cu.yd.	0.05
	GROUT	Cu.yd.	0.26
	BLOCK WEB MESH	Lin.ft.	32
	REINFORCEMENT STEEL		
	3/8" dia. bars.	Lin.ft.	109

## NOTES

Concrete block walls to be reinforced by placing high tension steel wire mesh, No. 9 wire, similar to Carter-Waters Blok-Mesh in horizontal block joints as shown in Sectional Elevation A-A.

The joint thickness between concrete blocks shall be about 1/4 in. The concrete blocks shall be laid with staggered vertical joints as shown on the plans. The openings in the blocks shall be aligned vertically and filled with concrete grout.

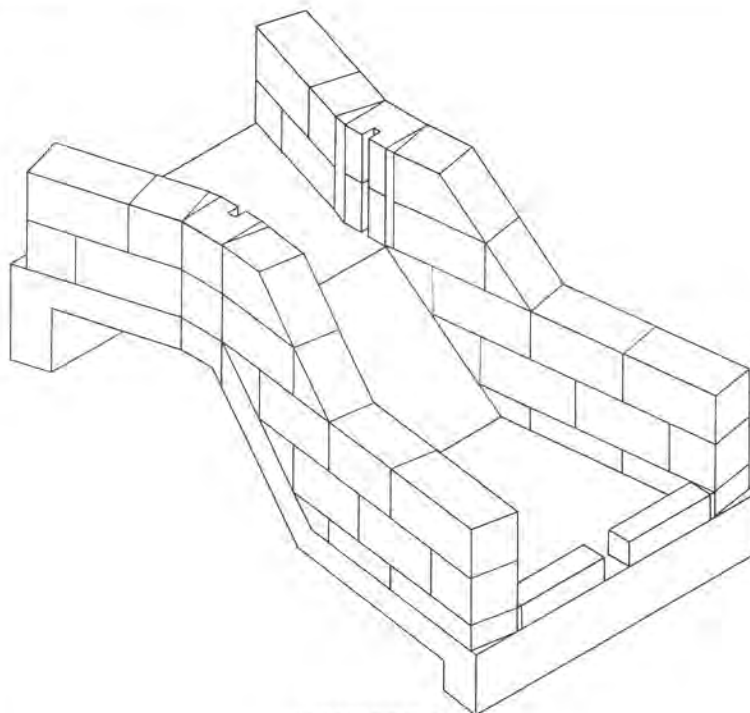
Q = 6.0 c.f.s.

CONCRETE BLOCK  
DRIVE-THRU IRRIGATION DROP

d = 12" H = 1'-0"

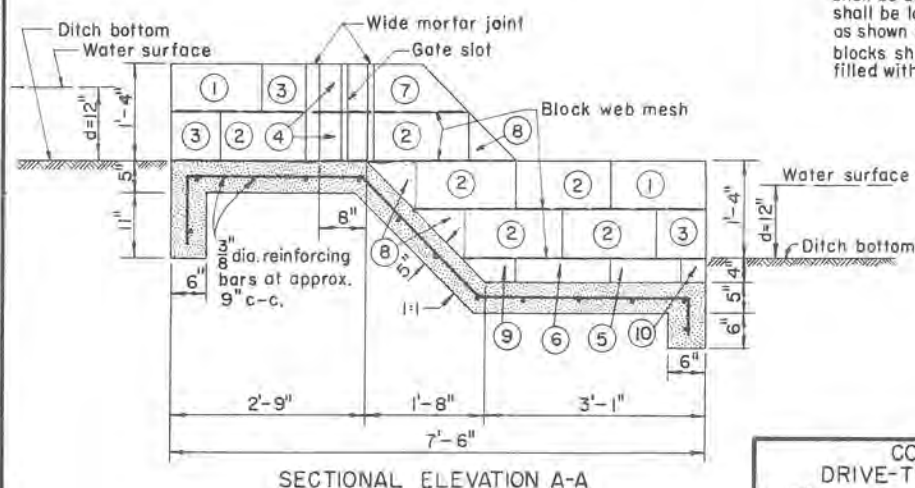
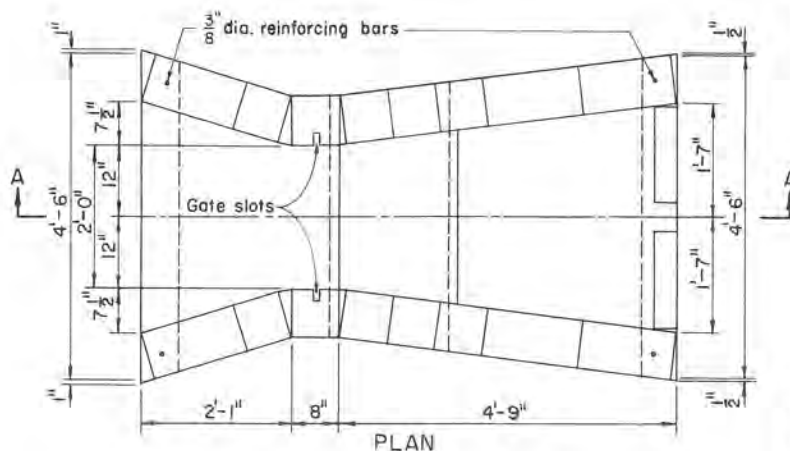
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED CHECKED DATE DRAWING NO.  
1-64 5,0-19,000.3-1



### BILL OF MATERIAL

MARK	DESCRIPTION	UNIT	QUAN.
1	8" x 8" x 16", corner block.	Ea.	4
2	8" x 8" x 16", stretcher block.	Ea.	12
3	8" x 8" x 16", corner block.	Ea.	6
4	8" x 8" x 8", corner block with gate slot.	Ea.	4
5	4" x 8" x 16", corner block	Ea.	2
6	4" x 8" x 16", stretcher block	Ea.	2
7	8" x 8" x 16", stretcher block with a 45° end cut.	Ea.	2
8	1/4 of an 8" x 8" x 16", stretcher block with a 45° end cut.	Ea.	6
9	3/8 of a 4" x 8" x 16", stretcher block with a 45° end cut	Ea.	2
10	4" x 4" x 16", corner block may replace usual concrete end sill.	Ea.	2
	CONCRETE		
	with concrete end sill	Cu.yd.	0.63
	with mark 10 blocks	Cu.yd.	0.61
	MORTAR	Cu.yd.	0.05
	GROUT	Cu.yd.	0.25
	BLOCK WEB MESH	Lin.ft.	36
	REINFORCEMENT STEEL		
	3/8" dia. bars	Lin. ft.	114



## NOTES

Concrete block walls to be reinforced by placing high tension steel wire mesh, No. 9 wire, similar to Carter-Waters Blok-Mesh in horizontal block joints as shown in Sectional Elevation A-A.

The joint thickness between concrete blocks shall be about 1/4 in. The concrete blocks shall be laid with staggered vertical joints as shown on the plans. The openings in the blocks shall be aligned vertically and filled with concrete grout.

 $Q = 6.0 \text{ c.f.s.}$ 

CONCRETE BLOCK  
DRIVE-THRU IRRIGATION DROP

 $d=12''$ 
$$H = 1' - 4''$$
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPLAINT

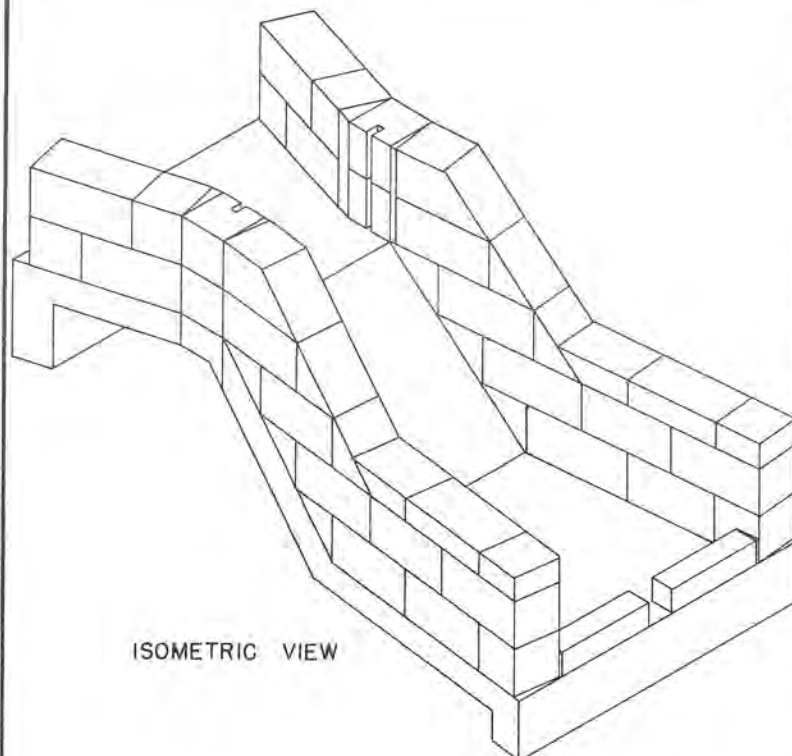
CHINESE

DAVE

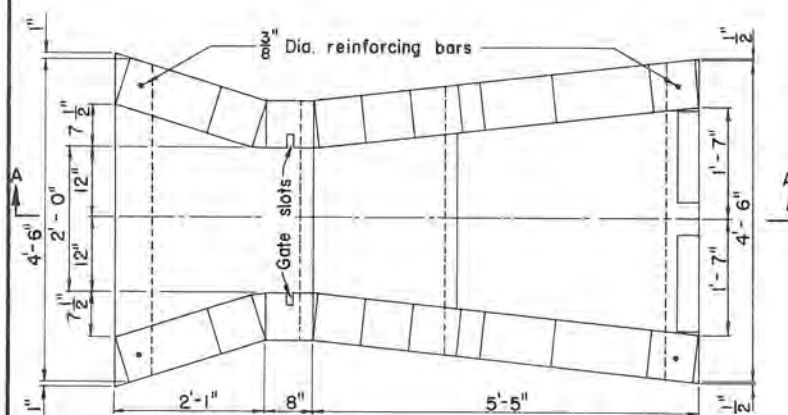
1. DRAWING NO.

1-64

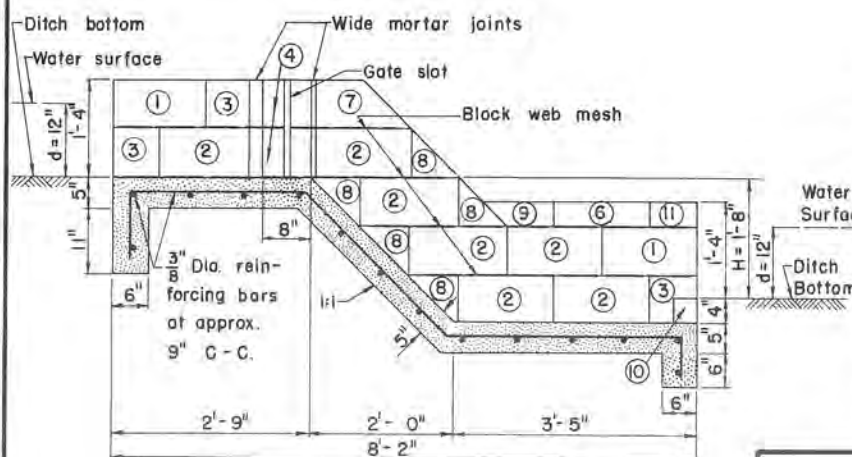
50 19000 3 2



ISOMETRIC VIEW



PLAN



SECTIONAL ELEVATION A-A

# BILL OF MATERIAL

MARK	DESCRIPTION	UNIT	QUAN.
1	8"x8"x16", corner block	Ea.	4
2	8"x8"x16", stretcher block	Ea.	14
3	8"x8"x8", corner block	Ea.	6
4	8"x8"x8", corner block with gate slot	Ea.	4
5	Not used	—	—
6	4"x8"x16", stretcher block	Ea.	2
7	8"x8"x16", stretcher block with 45° end cut	Ea.	2
8	1/4 of an 8"x8"x16" stretcher block with 45° end cut	Ea.	10
9	5/8 of a 4"x8"x16", stretcher block with 45° end cut	Ea.	2
10	4"x4"x16", corner block may replace usual concrete end sill	Ea.	2
11	4"x8"x8" corner block	Ea.	2
CONCRETE			
with concrete end sill		Cu.Yd.	0.67
with mark 10 blocks		Cu.Yd.	0.65
MORTAR		Cu.Yd.	0.05
GROUT		Cu.Yd.	0.29
BLOCK WEB MESH		Lin.Ft.	36
REINFORCEMENT STEEL			
3/8" dia. bars		Lin.Ft.	122

## NOTES

Concrete block walls to be reinforced by placing high tension steel wire mesh, No. 9 wire, similar to Carter-Waters Blok-Mesh in horizontal block joints as shown in Sectional Elevation A-A.

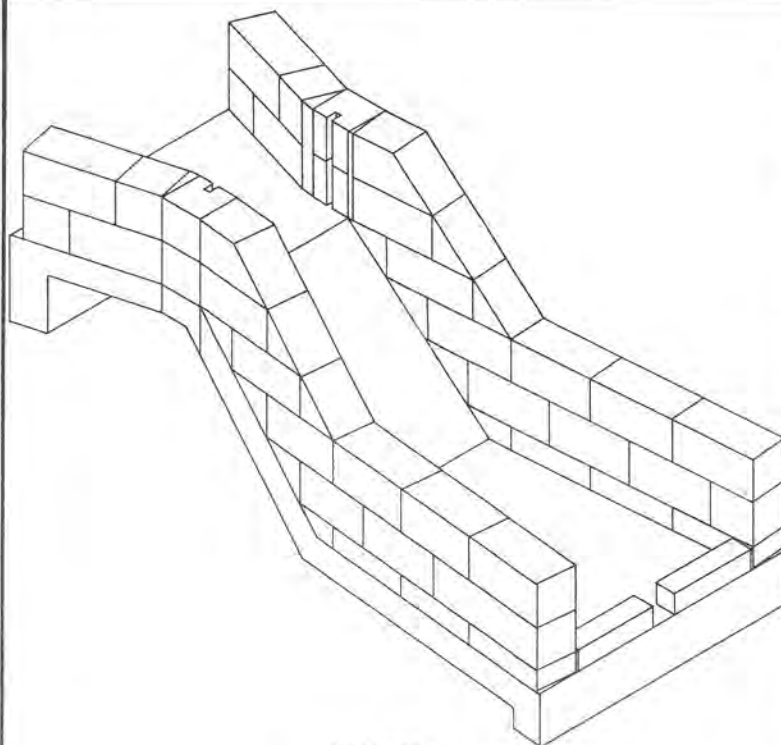
The joint thickness between concrete blocks shall be about 1/4 inch. The concrete blocks shall be laid with staggered vertical joints as shown on the plans. The openings in the blocks shall be aligned vertically and filled with concrete grout.

Q = 6.0 c.f.s.

CONCRETE BLOCK  
DRIVE - THRU IRRIGATION DROP  
d = 12" H = 1'-8"

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SOIL CONSERVATION SERVICE

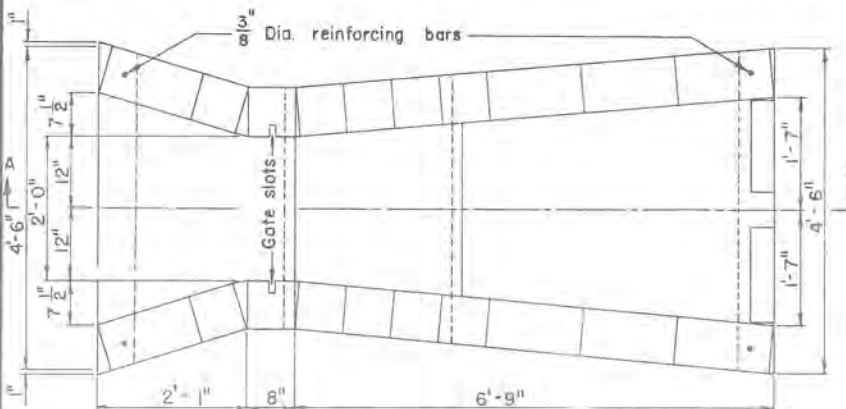
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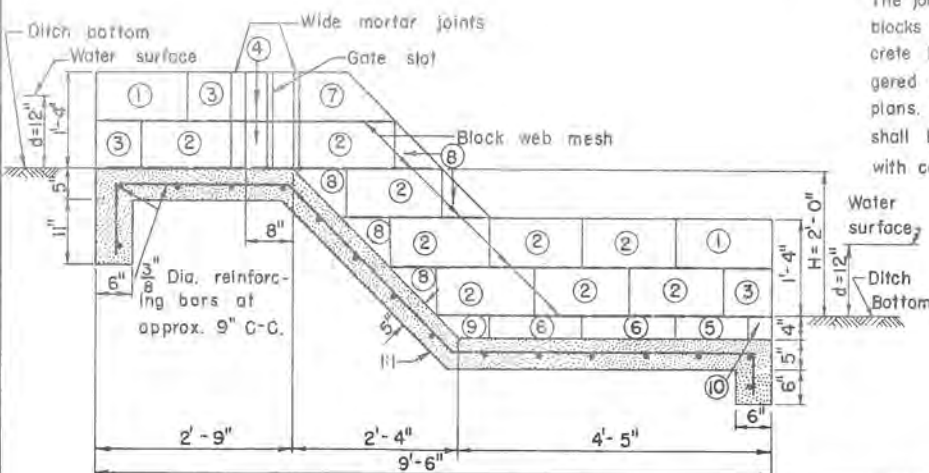
ISOMETRIC VIEW

# BILL OF MATERIALS

MARK	DESCRIPTION	UNIT	QUAN.
1	8" x 8" x 16", corner block	Ea.	4
2	8" x 8" x 16", stretcher block	Ea.	18
3	8" x 8" x 8", corner block	Ea.	6
4	8" x 8" x 8", corner block with gate slot	Ea.	4
5	4" x 8" x 16", corner block	Ea.	2
6	4" x 8" x 16", stretcher block	Ea.	4
7	8" x 8" x 16", stretcher block with 45° end cut	Ea.	2
8	$\frac{1}{4}$ of an 8" x 8" x 16" stretcher block with 45° end cut	Ea.	10
9	$\frac{3}{8}$ of a 4" x 8" x 16" stretcher block with 45° end cut	Ea.	2
10	4" x 4" x 16", corner block may replace usual concrete end sill	Ea.	2
CONCRETE			
with concrete end sill		Cu.Yd.	0.76
with mark 10 blocks		Cu.Yd.	0.74
MORTAR		Cu.Yd.	0.06
GROUT		Cu.Yd.	0.31
BLOCK WEB MESH		Lin.Ft.	42
REINFORCEMENT STEEL			
$\frac{3}{8}$ " dia. bars		Lin.Ft.	132



PLAN



SECTIONAL ELEVATION A-A

## NOTES

Concrete block walls to be reinforced by placing high tension steel wire mesh, No. 9 wire, similar to Carter-Waters Blok-Mesh in horizontal block joints as shown in Sectional Elevation A-A.

The joint thickness between concrete blocks shall be about  $\frac{1}{4}$  inch. The concrete blocks shall be laid with staggered vertical joints as shown on the plans. The openings in the blocks shall be aligned vertically and filled with concrete grout.

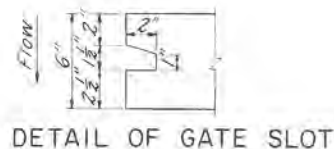
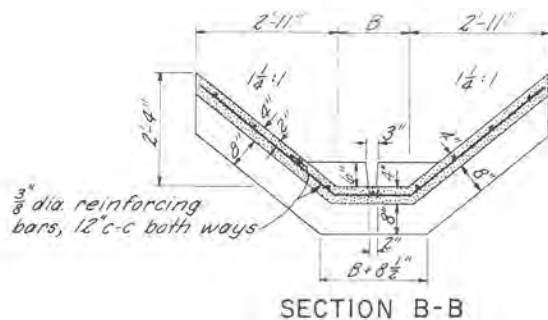
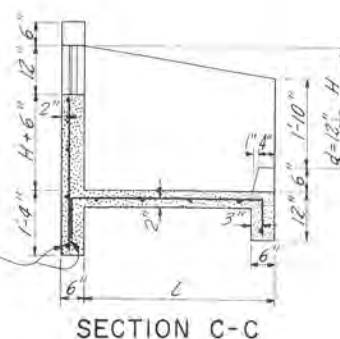
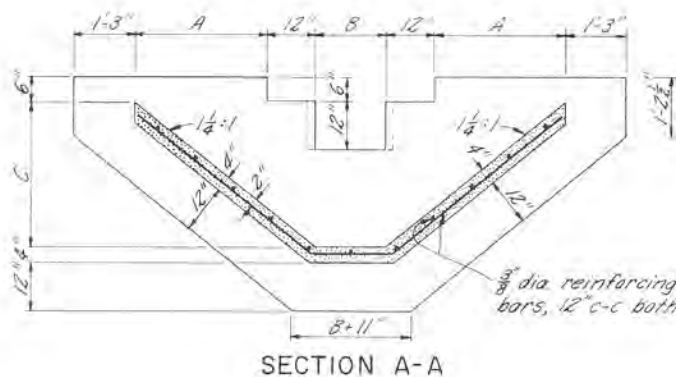
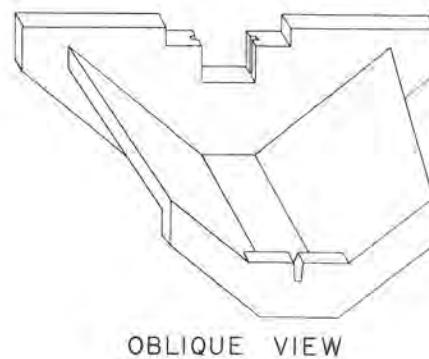
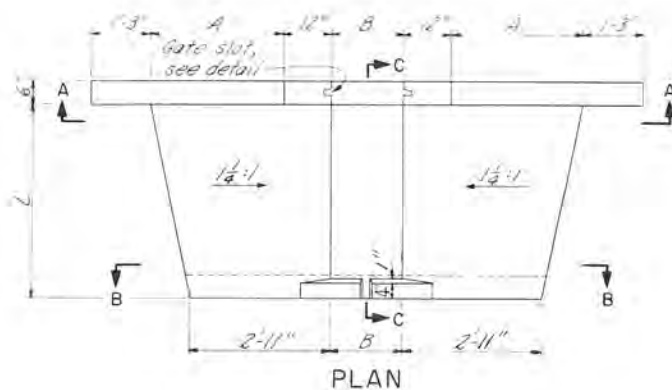
Q = 6.0 c.f.s.

CONCRETE BLOCK  
DRIVE - THRU IRRIGATION DROP  
d = 12" H = 2'-0"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.3-4





#### Notes:

6" x 6" No 10 wire mesh may be used in place of  $\frac{3}{8}$ " dia reinforcing bars.

#### Nomenclature:

B = bottom width of structure channel  
d = depth of water in ditch  
H = height of fall in water surface  
L = length of apron

TABLE OF DIMENSIONS AND QUANTITIES

H	L	A	C	B = 1'-6"		B = 2'-0"	
				Q = 4.33 c.f.s.		Q = 5.99 c.f.s.	
				Concrete cu. yd.	Steel lin. ft.	Concrete cu. yd.	Steel lin. ft.
1'-0"	3'-6"	2'-1 1/2"	2'-6"	0.98	178	1.03	183
1'-6"	4'-0"	2'-9"	3'-0"	1.17	196	1.23	201
2'-0"	4'-6"	3'-4 1/2"	3'-6"	1.40	243	1.47	249
2'-6"	5'-0"	4'-0"	4'-0"	1.66	280	1.73	286

Q = Capacity of drop =  $3.33 (B - 0.2d) d^{3/2}$  c.f.s.

#### VERTICAL TRAPEZOIDAL DROP

d = 12"

H = 1'-0" to 2'-6"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED

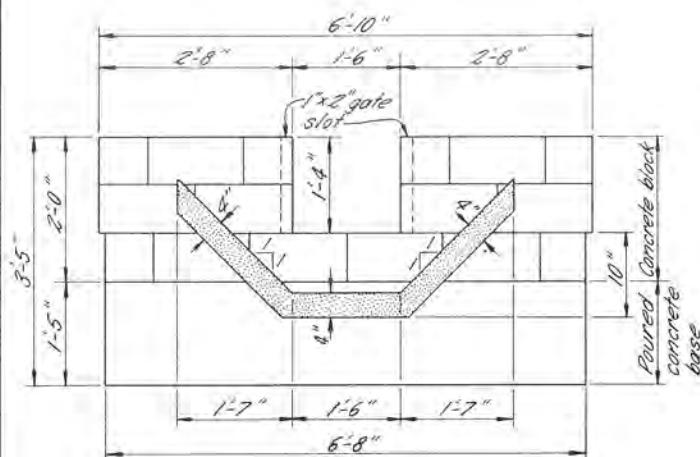
CHECKED

DATE

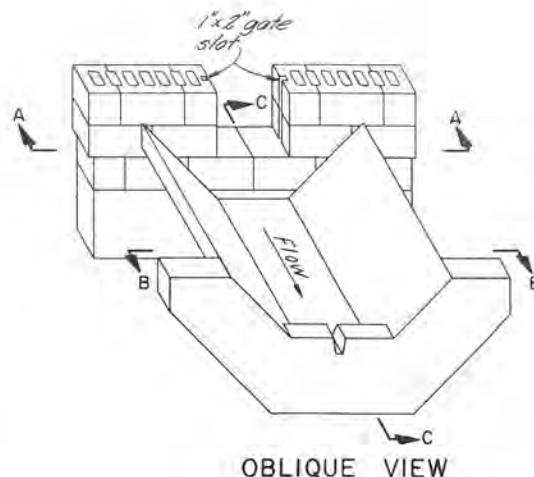
DRAWING NO.

1-64

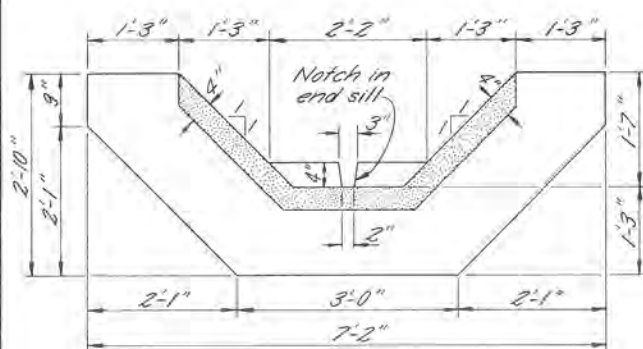
5,0-19,000.4-1



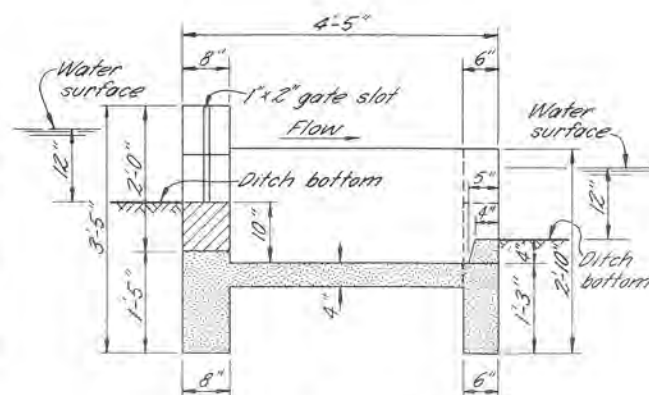
SECTIONAL ELEVATION A-A



OBLIQUE VIEW



SECTIONAL ELEVATION B-B



SECTIONAL ELEVATION C-C

Notes:

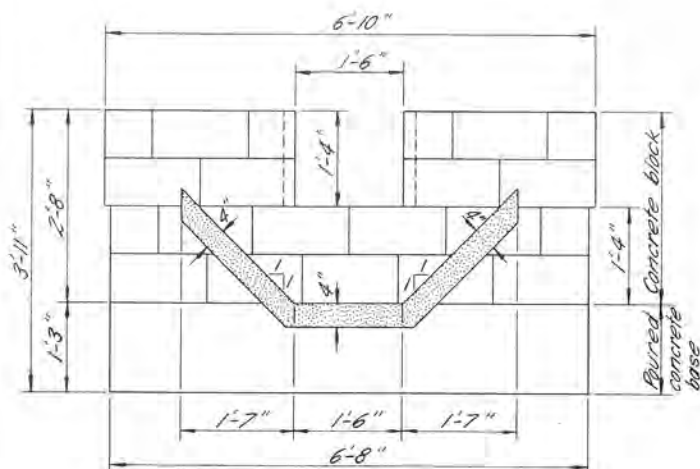
1. The joint thickness between concrete blocks shall be  $\frac{1}{4}$  inch. The concrete blocks shall be laid with broken vertical joints as shown. The openings in the blocks shall be aligned vertically to facilitate the filling of the holes with concrete grout.
2. The concrete block headwall shall be reinforced vertically at each gate slot with one  $\frac{1}{2}$  inch diameter bar placed in the holes in the blocks prior to filling with grout.
3. The concrete toe wall shall be poured against undisturbed earth where possible.
4. Nomenclature:  
H = height of fall in water surface.  
d = depth of water in ditch.
5. If concrete block with gate slot is unavailable, use precast block with 1 x 2" gate slot.

TABLE OF QUANTITIES

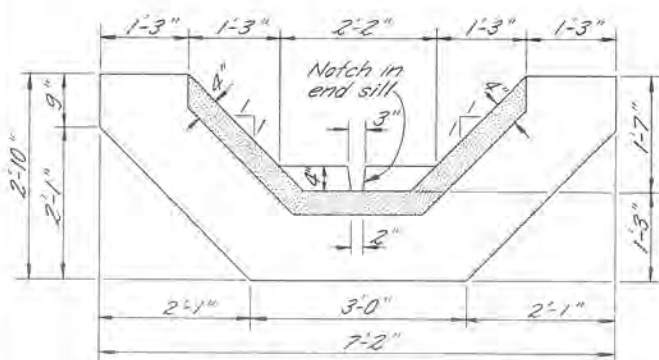
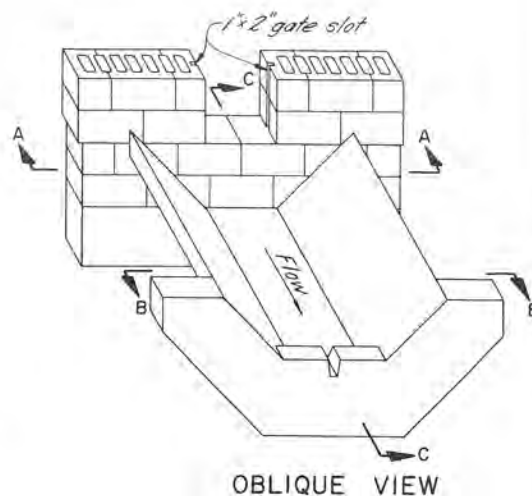
ITEM	AMOUNT
Concrete	0.75 cu. yds.

Q=3.6 cfs

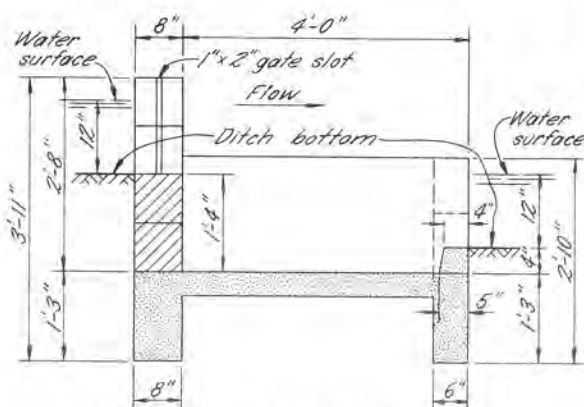
VERTICAL TRAPEZOIDAL DROP WITH CONCRETE BLOCK HEADWALL H = 6" d = 12"			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	50-19,000.5-1



SECTIONAL ELEVATION A-A



SECTIONAL ELEVATION B-B



SECTIONAL ELEVATION C-C

Notes:

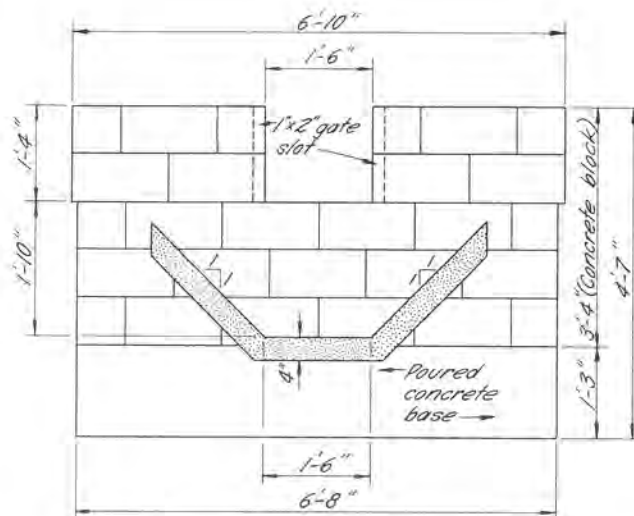
1. The joint thickness between concrete blocks shall be  $\frac{1}{4}$  inch. The concrete blocks shall be laid with broken vertical joints as shown. The openings in the blocks shall be aligned vertically to facilitate the filling of the holes with concrete grout.
2. The concrete block headwall shall be reinforced vertically at each gate slot with one  $\frac{1}{2}$  inch diameter bar placed in the holes in the blocks prior to filling with grout.
3. The concrete toe wall shall be poured against undisturbed earth where possible.
4. Nomenclature:  
H = height of fall in water surface.  
d = depth of water in ditch.
5. If concrete block with gate slot is unavailable, use precast block with 1'x2" gate slot.

TABLE OF QUANTITIES

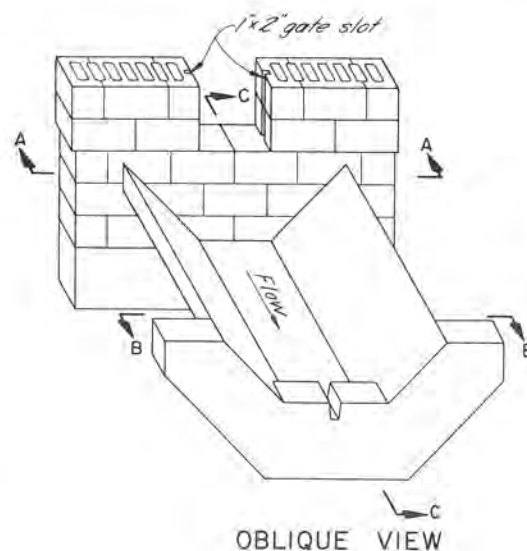
ITEM	AMOUNT
Concrete	0.75 cu. yds.

Q=4.3 c.f.s.

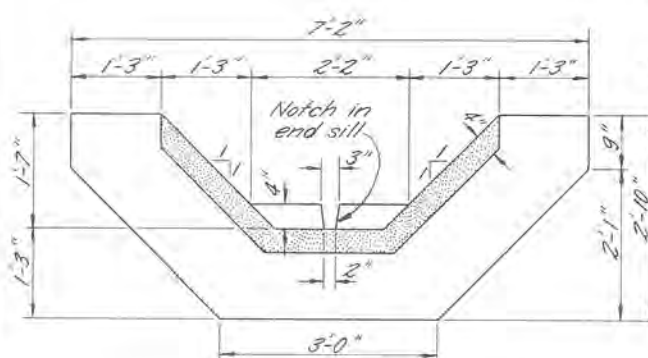
VERTICAL TRAPEZOIDAL DROP WITH CONCRETE BLOCK HEADWALL H=1'-0" d = 12"			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.5-2



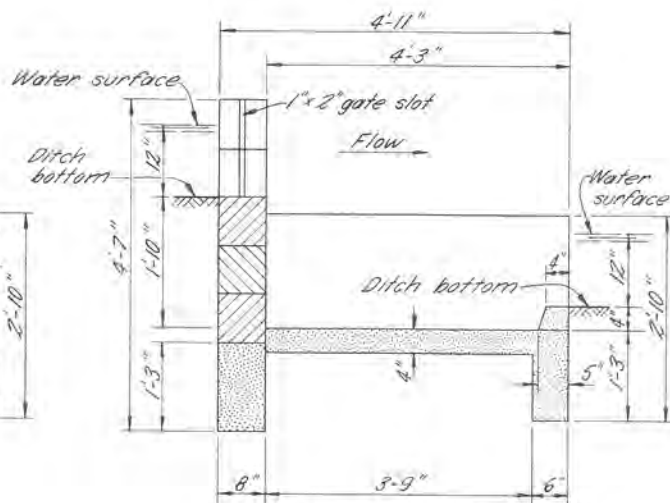
SECTIONAL ELEVATION A-A



OBLIQUE VIEW



SECTIONAL ELEVATION B-B



SECTIONAL ELEVATION C-C

Notes:

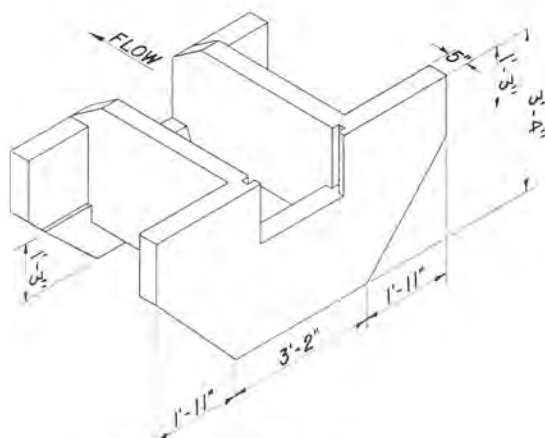
1. The joint thickness between concrete blocks shall be  $\frac{1}{4}$  inch. The concrete blocks shall be laid with broken vertical joints as shown. The openings in the blocks shall be aligned vertically to facilitate the filling of the holes with concrete grout.
2. The concrete block headwall shall be reinforced vertically at each gate slot with one  $\frac{1}{2}$  inch diameter bar placed in the holes in the blocks prior to filling with grout.
3. The concrete toe wall shall be poured against undisturbed earth where possible.
4. Nomenclature:  
H = height of fall in water surface.  
d = depth of water in ditch.
5. If concrete block with gate slot is unavailable, use precast block with 1" x 2" gate slot.

TABLE OF QUANTITIES

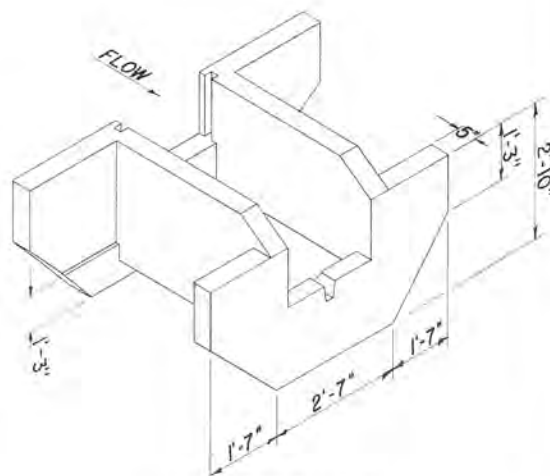
ITEM	AMOUNT
Concrete	0.76 cu. yds.

Q=4.3 cfs

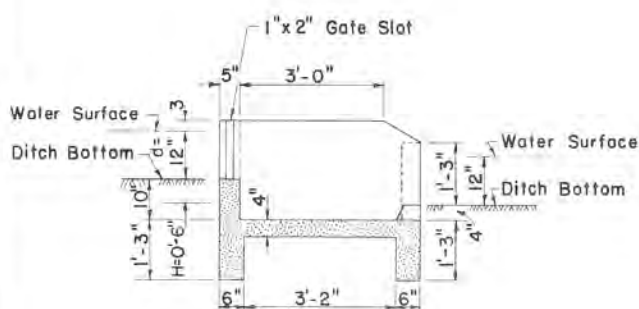
VERTICAL TRAPEZOIDAL DROP WITH CONCRETE BLOCK HEADWALL H=1'-6" d=12"			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.5-3



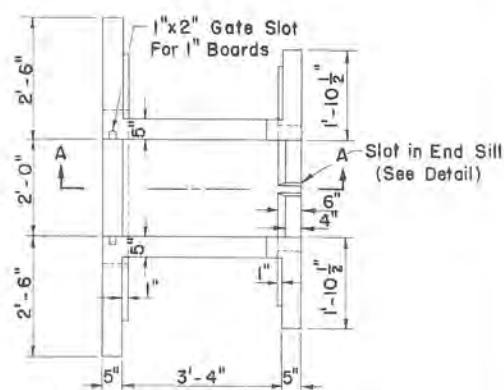
ISOMETRIC VIEW  
(LOOKING DOWNSTREAM)



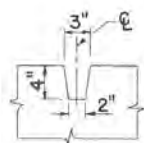
ISOMETRIC VIEW  
(LOOKING UPSTREAM)



SECTIONAL ELEVATION A-A



PLAN



ELEVATION  
(DETAIL OF SLOT IN END SILL)

#### NOTES

THE CONCRETE FOOTINGS FOR UPSTREAM WALL AND DOWNSTREAM WALL SHALL BE POURED AGAINST CONSOLIDATED MATERIAL. THE THICKNESS OF THE FOOTINGS SHALL NOT BE LESS THAN SIX INCHES.

THE THICKNESS OF THE CONCRETE IN THE FORMED WALLS SHALL NOT BE LESS THAN FIVE INCHES.

THE THICKNESS OF THE CONCRETE IN THE FLOOR SLAB SHALL NOT BE LESS THAN FOUR INCHES.

#### TABLE OF QUANTITIES

ITEM	AMOUNT
CONCRETE	0.78 CU. YDS.

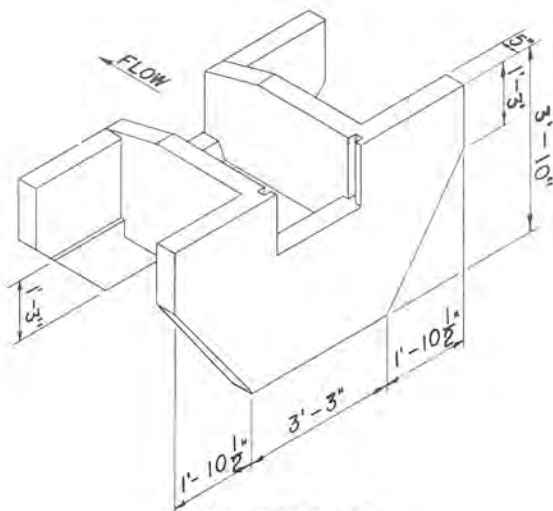
Q = 6.0 cfs

CONCRETE VERTICAL DROP  
FOR NONCOHESIVE SOILS  
d = 12" H = 0'-6"

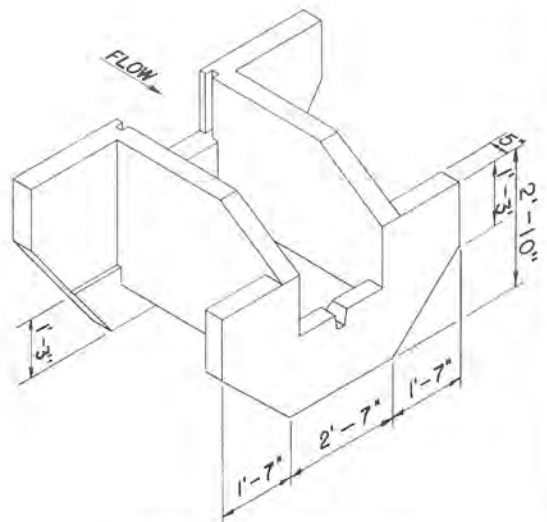
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	50-19,000,6-1

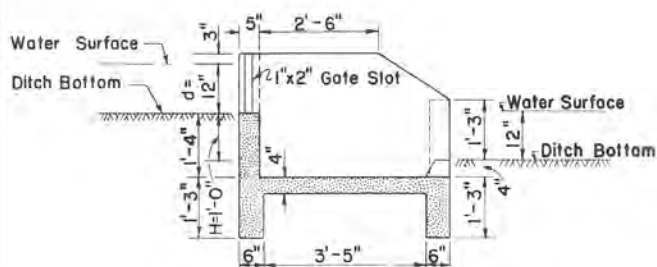




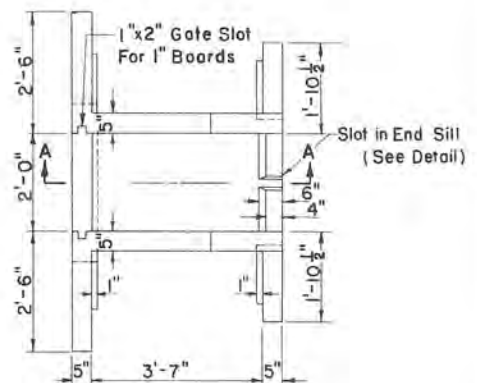
**ISOMETRIC VIEW**  
(LOOKING DOWNSTREAM)



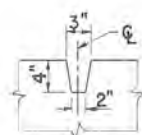
**ISOMETRIC VIEW**  
(LOOKING UPSTREAM)



**SECTIONAL ELEVATION A-A**



**PLAN**



**ELEVATION**  
(DETAIL OF SLOT IN END SILL)

**NOTES**

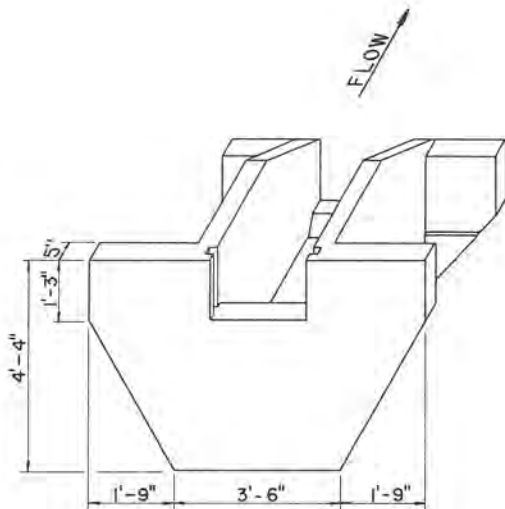
THE CONCRETE FOOTINGS FOR UPSTREAM WALL AND DOWNSTREAM WALL SHALL BE POURED AGAINST CONSOLIDATED MATERIAL. THE THICKNESS OF THE FOOTINGS SHALL NOT BE LESS THAN SIX INCHES.  
THE THICKNESS OF THE CONCRETE IN THE FORMED WALLS SHALL NOT BE LESS THAN FIVE INCHES.  
THE THICKNESS OF THE CONCRETE IN THE FLOOR SLAB SHALL NOT BE LESS THAN FOUR INCHES.

**TABLE OF QUANTITIES**

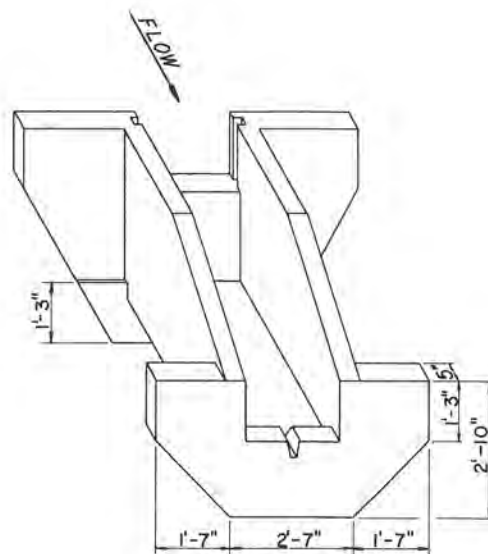
ITEM	AMOUNT
CONCRETE	0.90 CU.YDS.

Q = 6.0 cfs

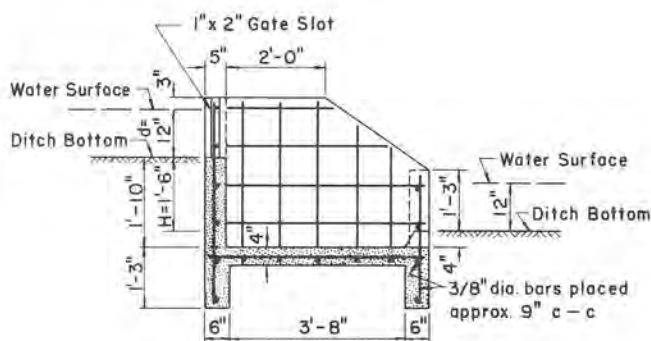
CONCRETE VERTICAL DROP FOR NONCOHESIVE SOILS			
d = 12"		H = 1' - 0"	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	50-19,000 6-2



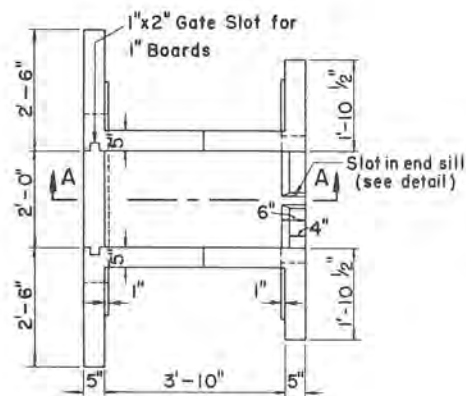
OBLIQUE VIEW  
(LOOKING DOWNSTREAM)



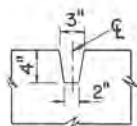
OBLIQUE VIEW  
(LOOKING UPSTREAM)



SECTIONAL ELEVATION A-A



PLAN



ELEVATION  
(DETAIL OF SLOT IN END SILL)

#### NOTES

THE CONCRETE FOOTINGS FOR UPSTREAM WALL AND DOWNSTREAM WALL SHALL BE POURED AGAINST CONSOLIDATED MATERIAL. THE THICKNESS OF THE FOOTINGS SHALL NOT BE LESS THAN SIX INCHES.

THE THICKNESS OF THE CONCRETE IN THE FORMED WALLS SHALL NOT BE LESS THAN FIVE INCHES.

THE THICKNESS OF THE CONCRETE IN THE FLOOR SLAB SHALL NOT BE LESS THAN FOUR INCHES.

REINFORCEMENT STEEL IN FLOOR, UPSTREAM FOOTING, AND DOWNSTREAM FOOTING SHALL BE 3/8" DIAMETER BARS PLACED AT CENTER OF SLAB AND SPACED APPROX. 9" CENTER TO CENTER BOTH WAYS.

REINFORCEMENT STEEL IN FORMED WALLS SHALL BE 3/8" DIAMETER BARS PLACED AT CENTER OF WALL AND SPACED APPROX. 9" CENTER TO CENTER BOTH WAYS. ALL VERTICAL BARS IN THE FORMED WALLS SHALL EXTEND FROM THE GROUND UPP. THESE BARS ARE TO BE PLACED ABOUT 2" FROM THE DIRT SIDE OF THE WALL AND THREE INCHES FROM THE AIR OR WATER SIDE. HORIZONTAL BARS IN FORMED WALLS SHALL BE PLACED ABOUT 3" FROM BOTTOM OF FOOTING AND SPACED APPROX. 9" CENTER TO CENTER UPWARD FROM BOTTOM BARS, AS SHOWN IN THE ELEVATION SECTION A-A.

TABLE OF QUANTITIES

ITEM	DESCRIPTION	AMOUNT
CONCRETE		1.02 CU. YDS.
REINFORCING STEEL	3/8" DIAMETER BARS	164.5 LIN. FT.

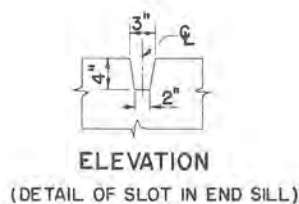
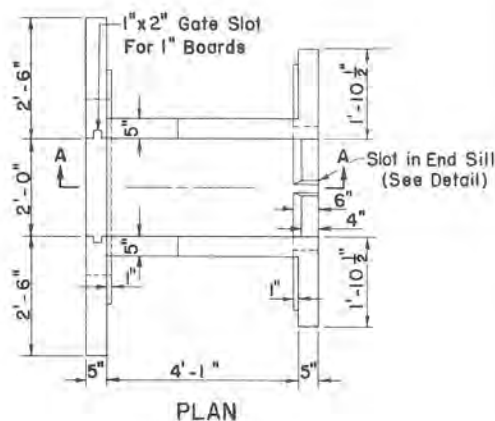
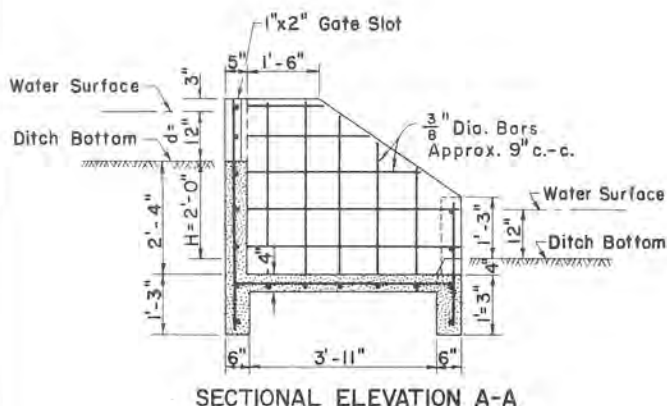
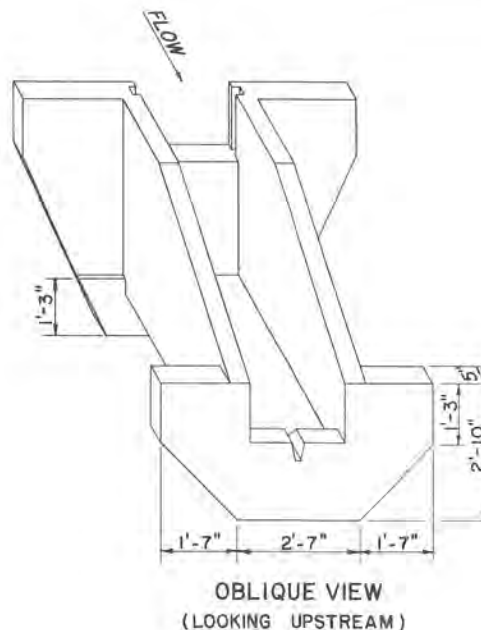
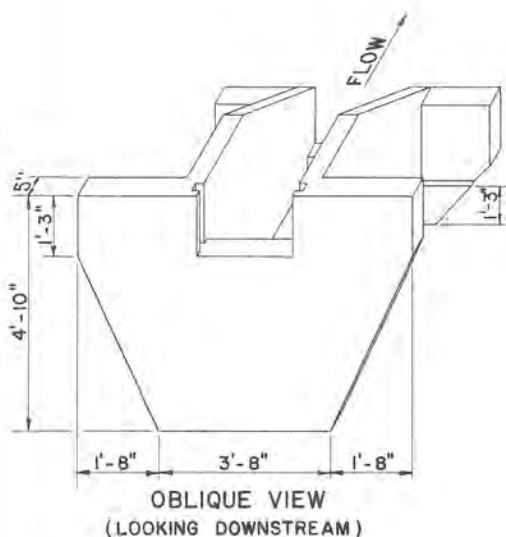
Q = 6.0 cfs

CONCRETE VERTICAL DROP  
FOR NONCOHESIVE SOILS

d = 12" H = 1'-6"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COUNTIES	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000,6-3



#### NOTES

THE CONCRETE FOOTINGS FOR UPSTREAM WALL AND DOWNSTREAM WALL SHALL BE POURED AGAINST CONSOLIDATED MATERIAL. THE THICKNESS OF THE FOOTINGS SHALL NOT BE LESS THAN SIX INCHES.

THE THICKNESS OF THE CONCRETE IN THE FORMED WALLS SHALL NOT BE LESS THAN FIVE INCHES.

THE THICKNESS OF THE CONCRETE IN THE FLOOR SLAB SHALL NOT BE LESS THAN FOUR INCHES.

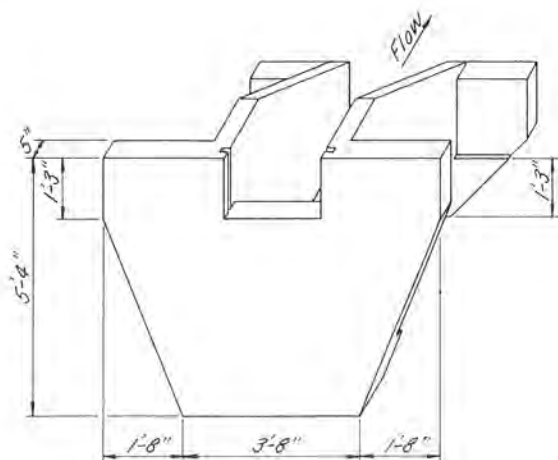
REINFORCEMENT STEEL IN FLOOR, UPSTREAM FOOTING, AND DOWNSTREAM FOOTING SHALL BE 3/8" DIAMETER BARS PLACED AT CENTER OF SLAB AND SPACED APPROX. 9" CENTER TO CENTER BOTH WAYS.

REINFORCEMENT STEEL IN FORMED WALLS SHALL BE 3/8" DIAMETER BARS PLACED AT CENTER OF WALL AND SPACED APPROX. 9" CENTER TO CENTER BOTH WAYS. ALL VERTICAL BARS IN THE FORMED WALLS SHALL EXTEND FROM THE GROUND UP. THESE BARS ARE TO BE PLACED ABOUT 2" FROM THE DIRT SIDE OF THE WALL AND THREE INCHES FROM THE AIR OR WATER SIDE. HORIZONTAL BARS IN FORMED WALLS SHALL BE PLACED ABOUT 3" FROM BOTTOM OF FOOTING AND SPACED APPROX. 9" CENTER TO CENTER UPWARD FROM BOTTOM BARS, AS SHOWN IN THE ELEVATION SECTION A-A.

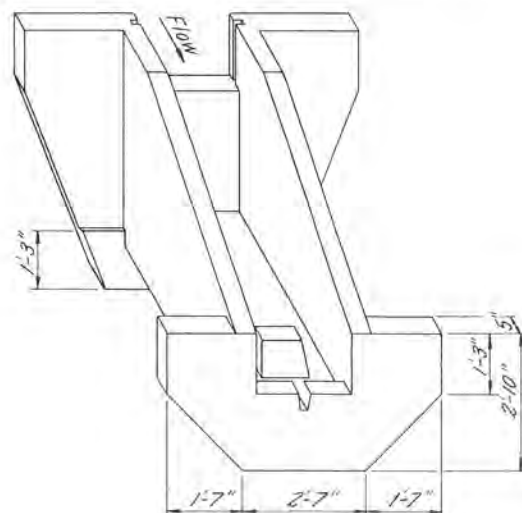
TABLE OF QUANTITIES		
ITEM	DESCRIPTION	AMOUNT
CONCRETE		1.13 CU.YOS.
REINFORCING STEEL	3/8" DIAMETER BARS	180.0 LIN.FT.

Q = 6.0 c.f.s.

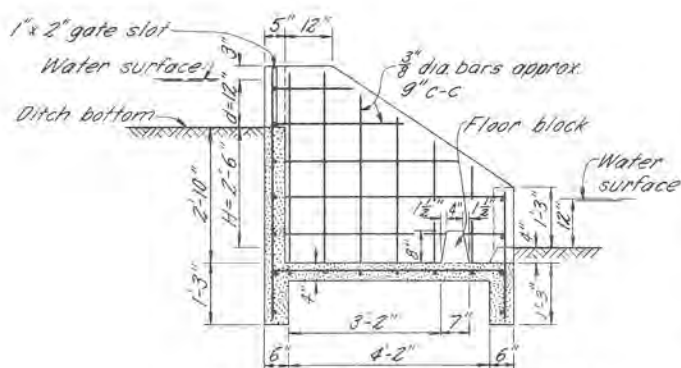
CONCRETE VERTICAL DROP FOR NONCOHESIVE SOILS			
d = 12"		H = 2'-0"	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
DESIGNED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000 6-4



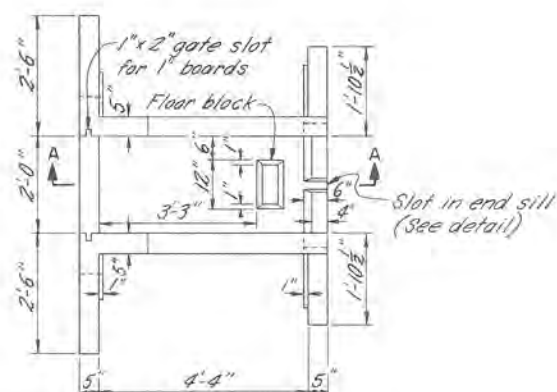
OBLIQUE VIEW  
LOOKING DOWNSTREAM



OBLIQUE VIEW  
LOOKING UPSTREAM



SECTIONAL ELEVATION A-A



PLAN



ELEVATION  
(DETAIL OF SLOT IN END SILL)

Notes:

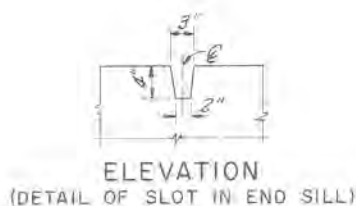
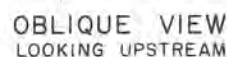
1. The concrete footings for upstream and downstream wall shall be poured against consolidated material. The thickness of the footings shall not be less than six inches.
2. The thickness of the concrete in the formed walls shall not be less than five inches.
3. The thickness of the concrete in the floor slab shall not be less than four inches.
4. Reinforcement steel in floor, upstream footing, and downstream footing shall be  $\frac{3}{8}$ " diameter bars placed at center of slab and spaced approximately 9" center to center both ways.
5. Reinforcement steel in formed walls shall be  $\frac{3}{8}$ " diameter bars placed at center of wall and spaced approximately 9" center to center both ways. All vertical bars in the formed walls shall extend from the ground up. These bars are to be placed about 2" from the dirt side of the wall and three inches from the air or water side. Horizontal bars in formed walls shall be placed about 3" from bottom of footing and spaced approximately 9" center to center upward from bottom bars, as shown in Sectional Elevation A-A.

TABLE OF QUANTITIES

ITEM	DESCRIPTION	AMOUNT
Concrete		1.23 Cu. Yd.
Reinforcing steel	$\frac{3}{8}$ " diameter bars	210 Lin. ft.

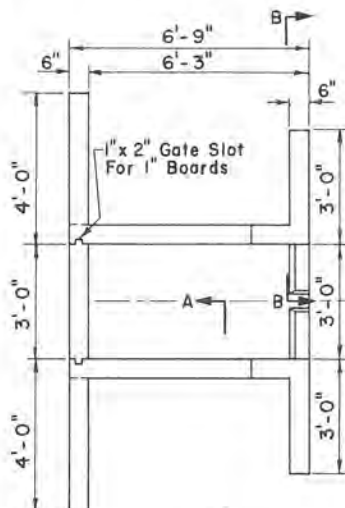
Q=6.0 c.f.s.

Q-8.0 C.T.S.			
CONCRETE VERTICAL DROP FOR NONCOHESIVE SOILS			
d=12"		H=2'-6"	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5.0-19,000.6-5

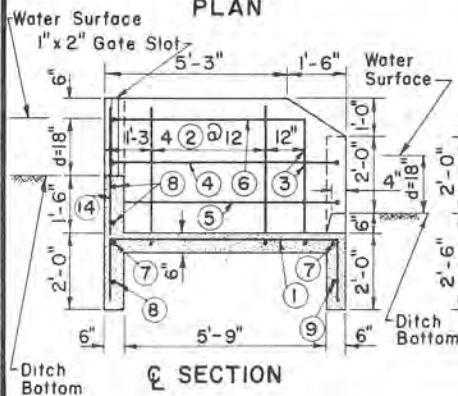


Q = 6.0 c. f. s.			
CONCRETE VERTICAL DROP FOR NONCOHESIVE SOILS			
d = 12"		H = 3'-0"	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	50-19,000.6-6





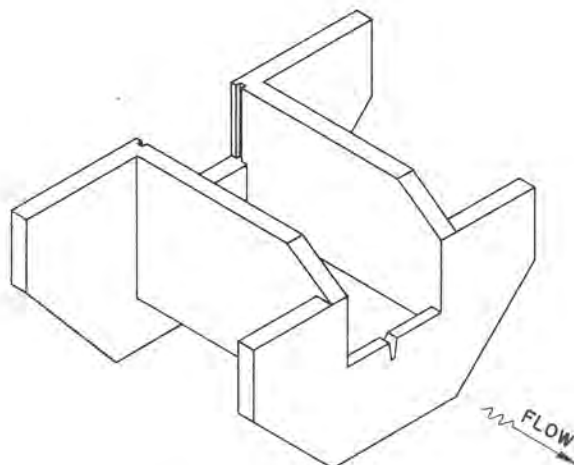
PLAN



SECTION A-A



SECTION B-B



ISOMETRIC VIEW

BAR SCHEDULE

MARK	SIZE	QUANT.	TYPE	A	B	G	LENGTH	TOTAL LENGTH
1	4	5	2	1-6	6-3	1-6	9-3	46-3
2	4	4	2	3-6	3-6	3-6	10-6	42-0
3	4	1	2	3-3	3-6	3-3	10-0	10-0
4	4	2	2	3-6	6-3	2-6	12-3	24-6
5	4	2	2	2-9	6-3	2-6	11-6	23-0
6	4	2	2	3-6	5-3		8-9	17-6
7	4	2	STR.				7-0	14-0
8	4	3	STR.				6-0	18-0
9	4	3	STR.				5-0	15-0
10	4	2	STR.				4-9	9-6
11	4	2	STR.				4-0	8-0
12	4	4	STR.				3-6	14-0
13	4	4	STR.				2-3	9-0
14	4	3	STR.				3-3	9-9
TOTAL								260-6

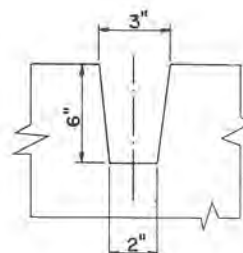
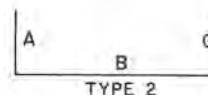
TABLE OF QUANTITIES

ITEM	UNIT	QUANTITY
CONCRETE	CU. YDS.	2.52
REINFORCING STEEL, 1/2" DIA.	LIN. FT.	260-6

NOTE: NOT TO SCALE  
WALL THICKNESS EQUALS 6"  
REINFORCE WITH 1/2" DIA.  
BARS @ 12" c-c BOTH WAYS

BAR TYPES

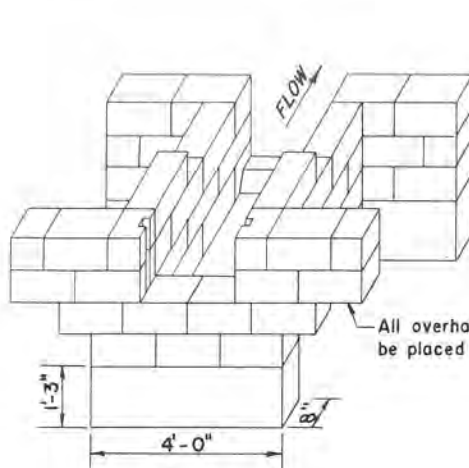
STRAIGHT  
STR.



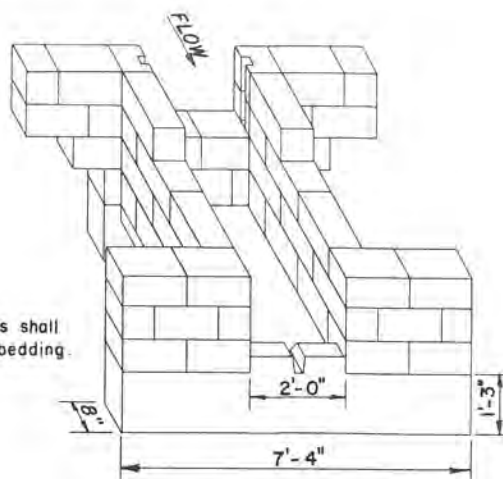
ELEVATION  
(DETAIL OF SLOT IN END SILL)

Q=12 cfs

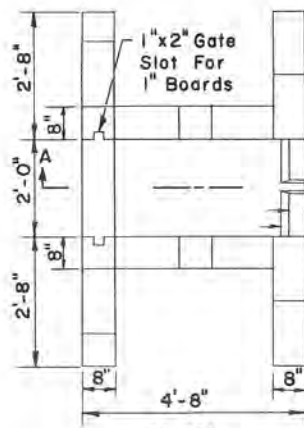
CONCRETE VERTICAL DROP FOR NONCOHESIVE SOILS			
d = 18"	B = 3'-0"	H = 1'-0"	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED JTP	CHECKED	DATE 1-64	DRAWING NO. 5,0-19,000,6-7



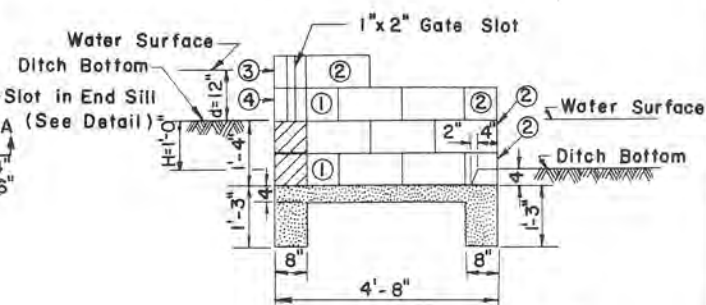
OBLIQUE VIEW  
(LOOKING DOWNSTREAM)



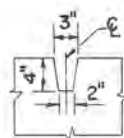
OBLIQUE VIEW  
(LOOKING UPSTREAM)



PLAN



SECTIONAL ELEVATION A-A



ELEVATION  
(DETAIL OF SLOT IN END SILL)

#### NOTES

CONCRETE BLOCK WALLS TO BE REINFORCED BY PLACING HIGH TENSION STEEL WIRE MESH, NO. 9 WIRE, SIMILAR TO CARTER-WATERS BLOCK-MESH IN ALL HORIZONTAL BLOCK JOINTS. LAP WIRE MESH 6 INCHES AT ALL SPLICES. THE MESH SHALL BE LAPPED SIX INCHES AT JUNCTION OF SIDEWALLS WITH HEADWALL AND DOWNSTREAM WINGWALLS SO AS TO EFFECTIVELY TIE THESE PARTS TOGETHER.

THE JOINT THICKNESS BETWEEN CONCRETE BLOCKS SHALL BE ABOUT 1/4 INCH. THE CONCRETE BLOCKS SHALL BE LAID WITH STAGGERED VERTICAL JOINTS AS SHOWN ON THE PLANS. THE OPENINGS IN THE BLOCKS SHALL BE ALIGNED VERTICALLY AND FILLED WITH CONCRETE GROUT. THE CONCRETE CUTOFF WALL AND TOEWALL ARE TO BE POURED AGAINST CONSOLIDATED MATERIAL.

TABLE OF QUANTITIES

ITEM NO.	MATERIAL	UNIT	QUANTITY
	CONCRETE	CU. YD.	.50
	MORTAR - 1 PART PORTLAND CEMENT TO 3 PARTS SAND WITH 5 LBS. HYDRATE LIME PER SACK OF CEMENT	CU. YD.	.03
	GROUT	CU. YD.	0.40
1	8" X 8" X 8" CORNER BLOCKS	EACH	8
2	8" X 8" X 16" CORNER BLOCKS	EACH	10
3	8" X 8" X 8" CORNER BLOCKS WITH GATE SLOT	EACH	2
4	8" X 8" X 16" CORNER BLOCKS WITH GATE SLOT	EACH	2
5	8" X 8" X 16" STRETCHER BLOCKS	EACH	27
	NO. 9 BLOCK MESH	LIN. FT.	41

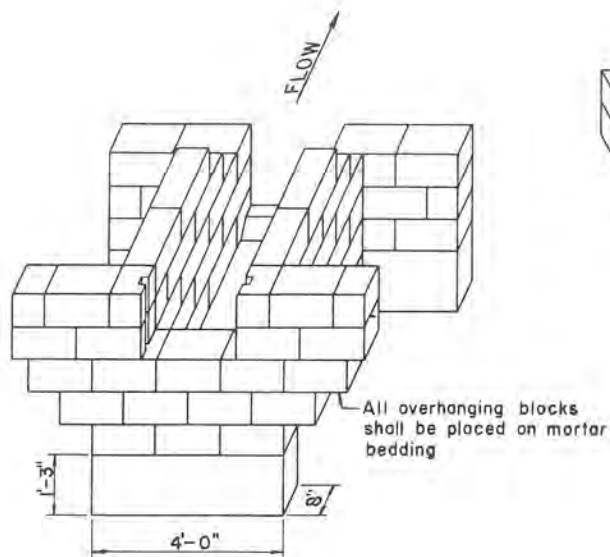
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CONCRETE BLOCK VERTICAL DROP  
FOR NONCOHESIVE SOILS

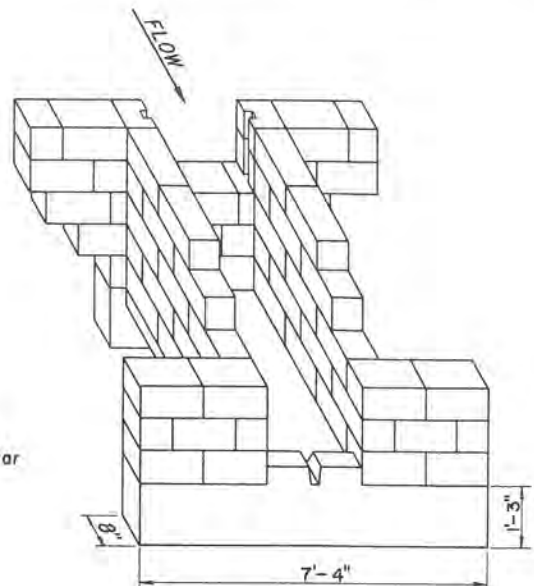
d = 12" H = 1'-0"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

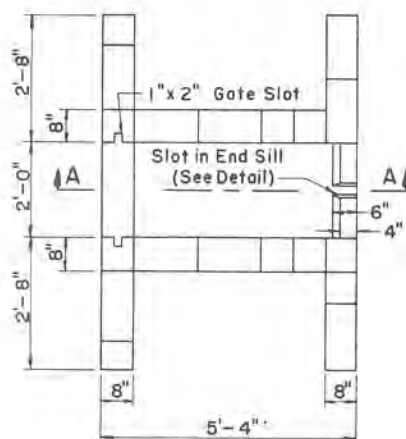
COMPILED: 1-64 DRAWING NO. 5,0-19,000-7-1



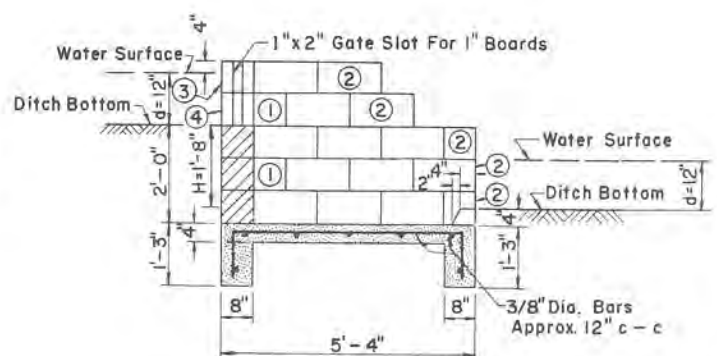
OBLIQUE VIEW  
(LOOKING DOWNSTREAM)



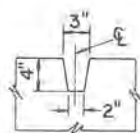
OBLIQUE VIEW  
(LOOKING UPSTREAM)



PLAN



SECTIONAL ELEVATION A-A



ELEVATION  
(DETAIL OF SLOT IN END SILL)

#### NOTES

REINFORCEMENT STEEL IN CONCRETE FLOOR, TOEWALL, AND CUTOFF WALL TO BE 3/8" DIAMETER BARS PLACED AT CENTER OF SLAB AND SPACED ABOUT 12" c-c BOTH WAYS. ALL LONGITUDINAL BARS TO BE BENT INTO CUTOFF WALL AND TOEWALL. 6" X 6" NO. 6 WELDED WIRE MESH MAY BE SUBSTITUTED FOR BARS.

CONCRETE BLOCK WALLS TO BE REINFORCED BY PLACING HIGH TENSION STEEL WIRE MESH, NO. 9 WIRE, SIMILAR TO CARTER-WATERS BLOX-MESH IN ALL HORIZONTAL BLOCK JOINTS. LAP WIRE MESH 6 INCHES AT ALL SPLICES. THE MESH SHALL BE LAPPED SIX INCHES AT JUNCTION OF SIDEWALLS WITH HEADWALL AND DOWNSTREAM WINGWALLS SO AS TO EFFECTIVELY TIE THESE PARTS TOGETHER.

THE JOINT THICKNESS BETWEEN CONCRETE BLOCKS SHALL BE ABOUT 1/4 INCH. THE CONCRETE BLOCKS SHALL BE LAID WITH STAGGERED VERTICAL JOINTS AS SHOWN ON THE PLANS. THE OPENINGS IN THE BLOCKS SHALL BE ALIGNED VERTICALLY AND FILLED WITH CONCRETE GROUT.

THE CONCRETE CUTOFF WALL AND TOEWALL ARE TO BE POURED AGAINST CONSOLIDATED MATERIAL.

TABLE OF QUANTITIES

ITEM NO.	MATERIAL	UNIT	QUANTITY
	CONCRETE	CU.YDS.	0.52
	MORTAR - 1 PART PORTLAND CEMENT TO 3 PARTS SAND WITH 5 LBS. HYDRATE LIME PER SACK OF CEMENT	CU.YDS.	.04
	GROUT	CU.YDS.	0.58
1	8" X 8" X 8" CORNER BLOCKS	EACH	8
2	8" X 8" X 16" CORNER BLOCKS	EACH	12
3	8" X 8" X 8" CORNER BLOCKS WITH GATE SLOT	EACH	2
4	8" X 8" X 16" CORNER BLOCKS WITH GATE SLOT	EACH	2
5	8" X 8" X 16" STRETCHER BLOCKS	EACH	40
	3/8" REINFORCING BARS	LIN.FT.	60
	NO. 9 BLOCK MESH	LIN.FT.	44

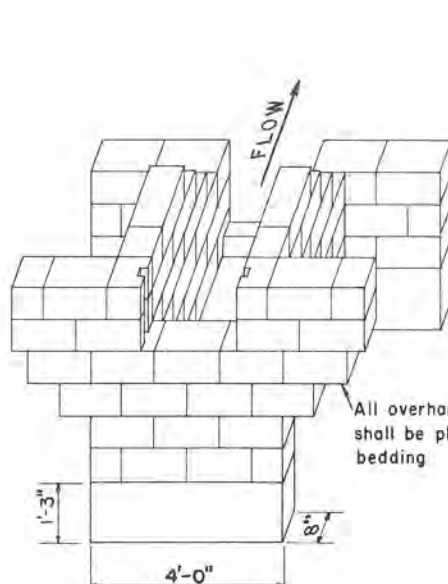
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CONCRETE BLOCK VERTICAL DROP  
FOR NONCOHESIVE SOILS

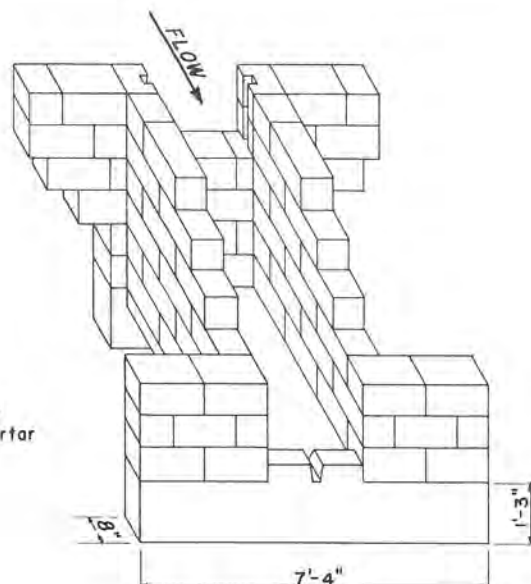
d=12" H=1'-8"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

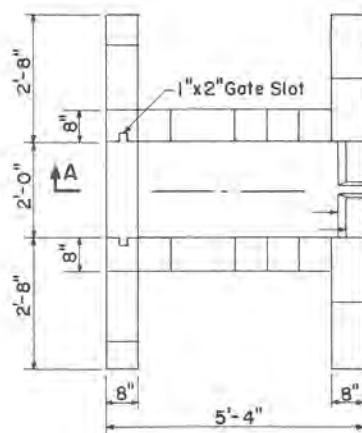
COMPILED CHECKED DATE 1-64 DRAWING NO. 50-19,000.7-2



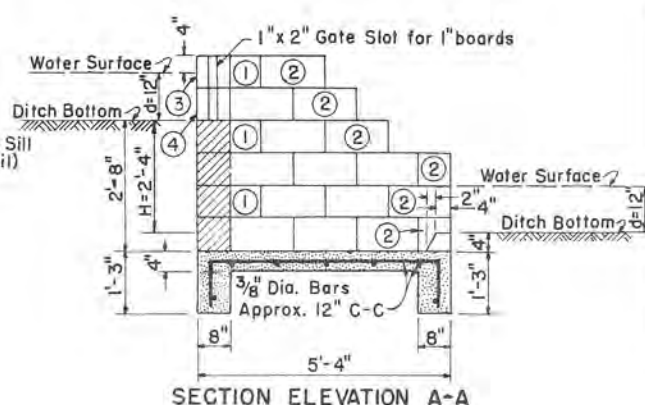
OBLIQUE VIEW  
(LOOKING DOWNSTREAM)



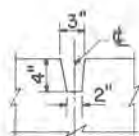
OBLIQUE VIEW  
(LOOKING UPSTREAM)



PLAN



SECTION ELEVATION A-A



ELEVATION  
(DETAIL OF SLOT IN END SILL)

#### NOTES

REINFORCEMENT STEEL IN CONCRETE FLOOR, TOEWALL, AND CUTOFF WALL TO BE 3/8" DIAMETER BARS PLACED AT CENTER OF SLAB AND SPACED ABOUT 12" C-C BOTH WAYS. ALL LONGITUDINAL BARS TO BE BENT INTO CUTOFF WALL AND TOEWALL. 6" X 6" NO. 6 WELDED WIRE MESH MAY BE SUBSTITUTED FOR BARS.

CONCRETE BLOCK WALL TO BE REINFORCED BY PLACING HIGH TENSION STEEL WIRE MESH. NO. 9 WIRE, SIMILAR TO CARTER-WATERS BLOK-MESH IN ALL HORIZONTAL BLOCK JOINTS. LAP WIRE MESH 6 INCHES AT ALL SPLICES. THE MESH SHALL BE LAPPED SIX INCHES AT JUNCTION OF SIDEWALLS WITH HEADWALL AND DOWNSTREAM WINGWALLS SO AS TO EFFECTIVELY TIE THESE PARTS TOGETHER.

THE JOINT THICKNESS BETWEEN CONCRETE BLOCKS SHALL BE ABOUT 1/4 INCH. THE CONCRETE BLOCKS SHALL BE LAID WITH STAGGERED VERTICAL JOINTS AS SHOWN ON THE PLANS. THE OPENINGS IN THE BLOCKS SHALL BE ALIGNED VERTICALLY AND FILLED WITH CONCRETE GROUT.

THE CONCRETE CUTOFF WALL AND TOEWALL ARE TO BE POURED AGAINST CONSOLIDATED MATERIAL.

TABLE OF QUANTITIES

ITEM NO.	MATERIAL	UNIT	QUANTITY
	CONCRETE	CU.YDS.	0.53
	MORTAR - 1 PART PORTLAND CEMENT TO 3 PARTS SAND WITH 5 LBS. HYDRATE LIME PER SACK OF CEMENT	CU.YDS.	.05
	GROUT	CU.YDS.	0.63
1	8" X 8" X 8" CORNER BLOCKS	EACH	12
2	8" X 8" X 16" CORNER BLOCKS	EACH	14
3	8" X 8" X 8" CORNER BLOCKS WITH GATE SLOT	EACH	2
4	8" X 8" X 16" CORNER BLOCKS WITH GATE SLOT	EACH	2
5	8" X 8" X 16" STRETCHER BLOCKS	EACH	42
	3/8" DIAMETER REINFORCING BARS	LIN.FT.	59
	NO. 9 BLOCK MESH	LIN.FT.	70

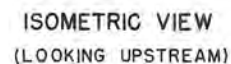
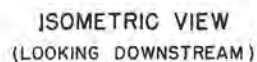
Q = 6.0 cfs

CONCRETE BLOCK VERTICAL DROP  
FOR NONCOHESIVE SOILS

d = 12" H = 2'-4"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPLETED CHECKED DATE 1-64 DRAWING NO. 5,0-19,000.7-3



## NOTES

THE CONCRETE FOOTINGS FOR UPSTREAM WALL AND DOWNSTREAM WALL SHALL BE POURED AGAINST CONSOLIDATED MATERIAL. THE THICKNESS OF THE FOOTINGS SHALL NOT BE LESS THAN SIX INCHES.

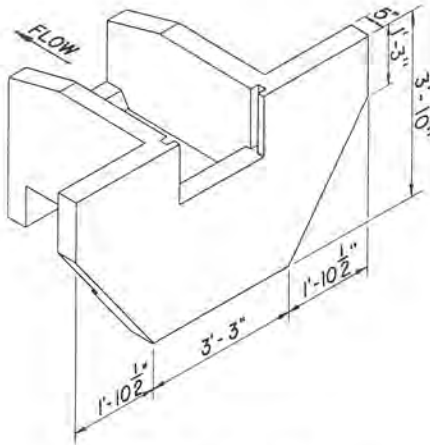
THE THICKNESS OF THE CONCRETE IN THE FORMED WALLS SHALL NOT BE LESS THAN FIVE INCHES.

THE THICKNESS OF THE CONCRETE IN THE FLOOR SLAB SHALL NOT BE LESS THAN FOUR INCHES.

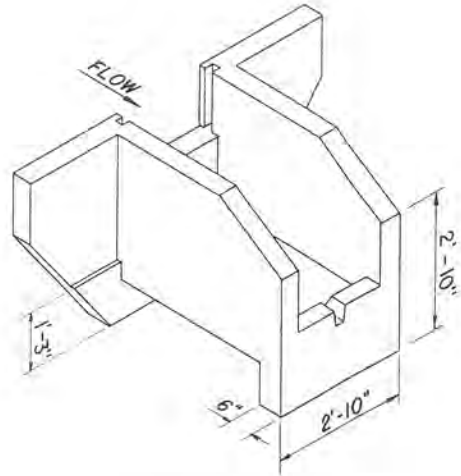
 $Q = 6.0 \text{ c.f.s.}$ 

CONCRETE VERTICAL DROP FOR COHESIVE SOILS			
d= 12"		H=0'-6"	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5.0-19,000.8-1

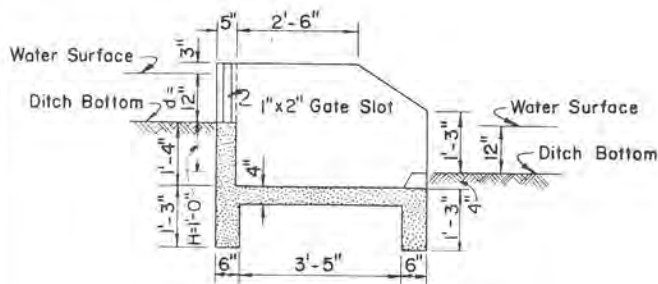




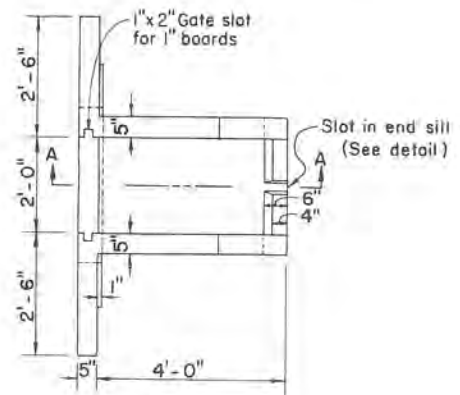
ISOMETRIC VIEW  
(LOOKING DOWNSTREAM)



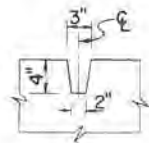
ISOMETRIC VIEW  
(LOOKING UPSTREAM)



SECTIONAL ELEVATION A-A



PLAN



ELEVATION  
(DETAIL OF SLOT IN END SILL)

#### NOTES

THE CONCRETE FOOTINGS FOR UPSTREAM WALL AND DOWNSTREAM WALL SHALL BE POURED AGAINST CONSOLIDATED MATERIAL. THE THICKNESS OF THE FOOTINGS SHALL NOT BE LESS THAN SIX INCHES.  
THE THICKNESS OF THE CONCRETE IN THE FORMED WALLS SHALL NOT BE LESS THAN FIVE INCHES.  
THE THICKNESS OF THE CONCRETE IN THE FLOOR SLAB SHALL NOT BE LESS THAN FOUR INCHES.

#### TABLE OF QUANTITIES

ITEM	AMOUNT
CONCRETE	0.80 CU. YDS.

Q=6.0 cfs

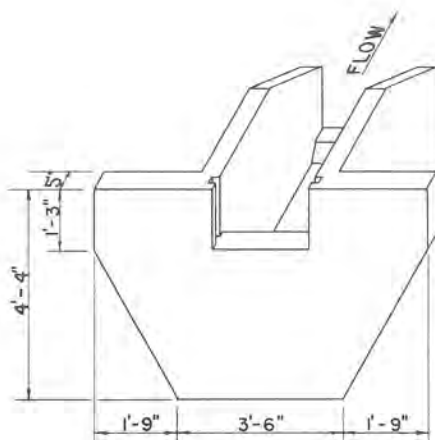
CONCRETE VERTICAL DROP  
FOR COHESIVE SOILS

d=12"

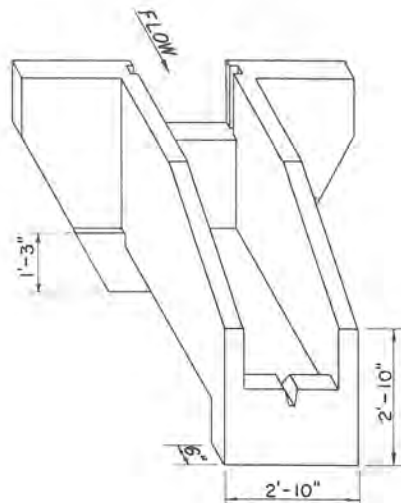
H=1'-0"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

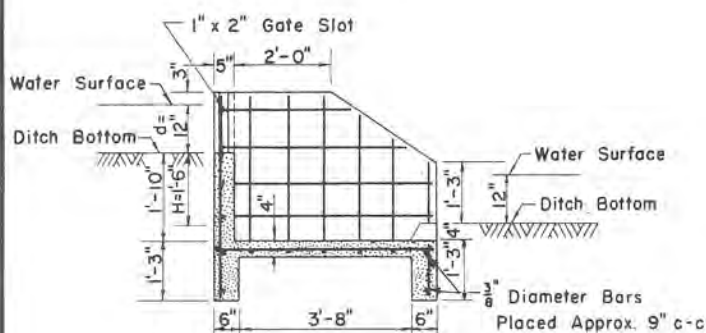
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		1-64	5,0-19,000.8-2



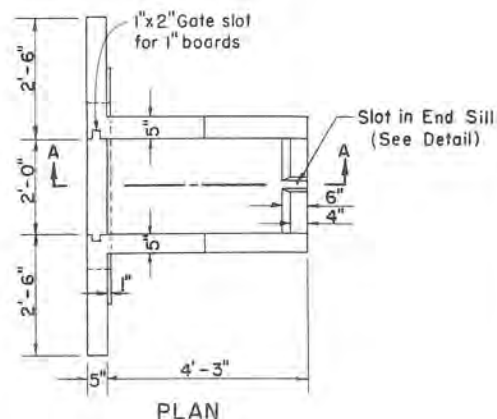
OBLIQUE VIEW  
(LOOKING DOWNSTREAM)



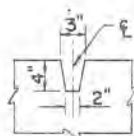
OBLIQUE VIEW  
(LOOKING UPSTREAM)



SECTIONAL ELEVATION A-A



PLAN



ELEVATION  
(DETAIL OF SLOT IN END SILL)

#### NOTES

THE CONCRETE FOOTINGS FOR UPSTREAM WALL AND DOWNSTREAM WALL SHALL BE POURED AGAINST CONSOLIDATED MATERIAL. THE THICKNESS OF THE FOOTINGS SHALL NOT BE LESS THAN SIX INCHES.

THE THICKNESS OF THE CONCRETE IN THE FORMED WALLS SHALL NOT BE LESS THAN FIVE INCHES.

THE THICKNESS OF THE CONCRETE IN THE FLOOR SLAB SHALL NOT BE LESS THAN FOUR INCHES.

REINFORCEMENT STEEL IN FLOOR, UPSTREAM FOOTING, AND DOWNSTREAM FOOTING SHALL BE 3/8" DIAMETER BARS PLACED AT CENTER OF SLAB AND SPACED APPROX. 9" CENTER TO CENTER BOTH WAYS.

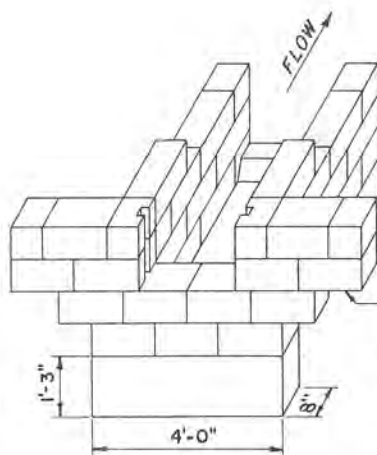
REINFORCEMENT STEEL IN FORMED WALLS SHALL BE 3/8" DIAMETER BARS PLACED AT CENTER OF WALL AND SPACED APPROX. 9" CENTER TO CENTER BOTH WAYS. ALL VERTICAL BARS IN THE FORMED WALLS SHALL EXTEND FROM THE GROUND UP. THESE BARS ARE TO BE PLACED ABOUT 2" FROM THE DIRT SIDE OF THE WALL AND THREE INCHES FROM THE AIR OR WATER SIDE. HORIZONTAL BARS IN FORMED WALLS SHALL BE PLACED ABOUT 3" FROM BOTTOM OF FOOTING AND SPACED APPROX. 9" CENTER TO CENTER UPWARD FROM BOTTOM BARS, AS SHOWN IN THE ELEVATION SECTION A-A.

TABLE OF QUANTITIES

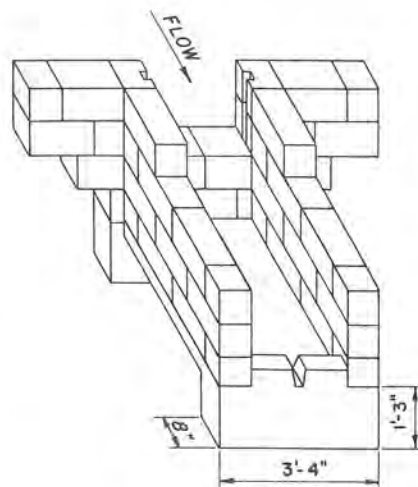
ITEM	DESCRIPTION	AMOUNT
CONCRETE		0.91 CU. YDS.
REINFORCING STEEL	3/8" DIAMETER BARS	149.0 LIN. FT.

Q=6.0 cfs

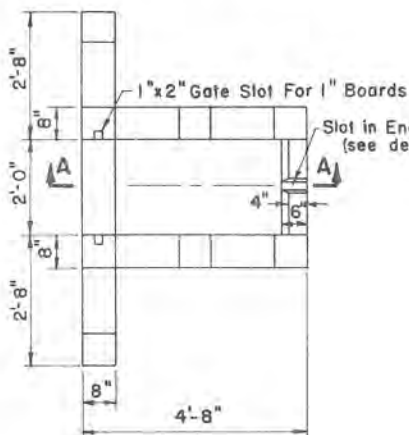
CONCRETE VERTICAL DROP FOR COHESIVE SOILS			
d = 12"		H = 1'-6"	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPLETED	CHECKED	DATE	DRAWING NO.
		1-64	5.0-19,000.8-3



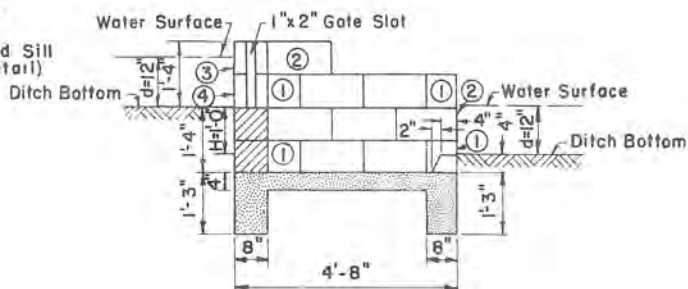
OBLIQUE VIEW  
(LOOKING DOWNSTREAM)



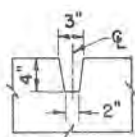
OBLIQUE VIEW  
(LOOKING UPSTREAM)



PLAN



SECTIONAL ELEVATION A-A



ELEVATION

(DETAIL OF SLOT IN END SILL)

#### NOTES

CONCRETE BLOCK WALLS TO BE REINFORCED BY PLACING HIGH TENSION STEEL WIRE MESH, NO. 9 WIRE, SIMILAR TO CARTER-WATERS BLOK-MESH IN ALL HORIZONTAL BLOCK JOINTS. LAP WIRE MESH 6 INCHES AT ALL SPLICES. THE MESH SHALL BE LAPPED SIX INCHES AT JUNCTION OF SIDEWALLS WITH HEADWALL SO AS TO EFFECTIVELY TIE THESE PARTS TOGETHER.

THE JOINT THICKNESS BETWEEN CONCRETE BLOCKS SHALL BE ABOUT 1/4 INCH. THE CONCRETE BLOCKS SHALL BE LAID WITH STAGGERED VERTICAL JOINTS AS SHOWN ON THE PLANS. THE OPENINGS IN THE BLOCKS SHALL BE ALIGNED VERTICALLY AND FILLED WITH CONCRETE GROUT.

THE CONCRETE CUTOFF WALL AND TOEWALL ARE TO BE POURED AGAINST CONSOLIDATED MATERIAL.

TABLE OF QUANTITIES

ITEM NO.	MATERIAL	UNIT	QUANTITY
	CONCRETE	CU.YD.	.40
	MORTAR - 1 PART PORTLAND CEMENT TO 3 PARTS SAND WITH 5 LBS. HYDRATE LIME PER SACK OF CEMENT	CU.YD.	.03
	GROUT	CU.YD.	.30
1.	8" X 8" X 8" CORNER BLOCKS	EACH	10
2.	8" X 8" X 16" CORNER BLOCKS	EACH	4
3.	8" X 8" X 8" CORNER BLOCKS WITH GATE SLOT	EACH	2
4.	8" X 8" X 16" CORNER BLOCKS WITH GATE SLOT	EACH	2
5.	8" X 8" X 16" STRETCHER BLOCKS	EACH	23
	NO. 9 BLOCK MESH	LIN.FT.	32

Q = 6.0 cfs

CONCRETE BLOCK VERTICAL DROP  
FOR COHESIVE SOILS

d = 12"

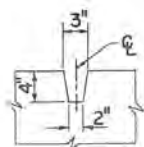
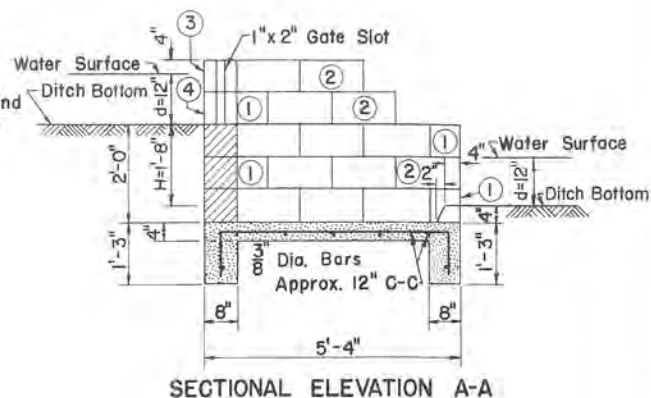
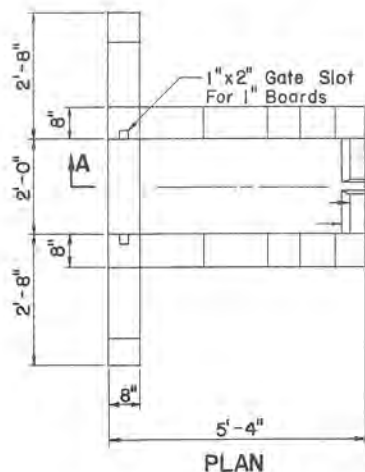
H = 1'-0"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED: DATE: 1-64  
DRAWING NO. 5,0-19,000.9-1

ISOMETRIC VIEW  
(LOOKING DOWNSTREAM)

ISOMETRIC VIEW  
(LOOKING UPSTREAM)



ELEVATION  
(DETAIL OF SLOT IN END SILL)

## NOTES

REINFORCEMENT STEEL IN CONCRETE FLOOR, TOEWALL, AND CUTOFF WALL TO BE 3/8" DIAMETER BARS PLACED AT CENTER OF SLAB AND SPACED ABOUT 12" C-C BOTH WAYS. ALL LONGITUDINAL BARS TO BE BENT INTO CUTOFF WALL AND TOEWALL. 6" X 6" NO. 6 WELDED WIRE MESH MAY BE SUBSTITUTED FOR BARS.

CONCRETE BLOCK WALLS TO BE REINFORCED BY PLACING HIGH TENSION STEEL WIRE MESH NO. 9 WIRE, SIMILAR TO CARTER-WATERS BLOK-MESH IN ALL HORIZONTAL BLOCK JOINTS. LAP WIRE MESH 6 INCHES AT ALL SPLICES. THE MESH SHALL BE LAPPED SIX INCHES AT JUNCTION OF SIDEWALLS WITH HEAD WALL SO AS TO EFFECTIVELY TIE THESE PARTS TOGETHER.

THE JOINT THICKNESS BETWEEN CONCRETE BLOCKS SHALL BE ABOUT 1/4 INCH. THE CONCRETE BLOCKS SHALL BE LAID WITH STAGGERED VERTICAL JOINTS AS SHOWN ON THE PLANS. THE OPENINGS IN THE BLOCKS SHALL BE ALIGNED VERTICALLY AND FILLED WITH CONCRETE GROUT. THE CONCRETE CUTOFF WALL AND TOEWALL ARE TO BE POURED AGAINST CONSOLIDATED MATERIAL.

TABLE OF QUANTITIES

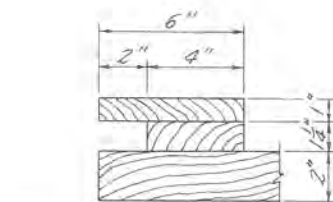
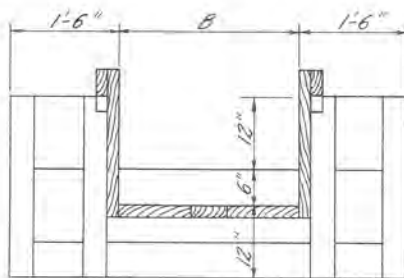
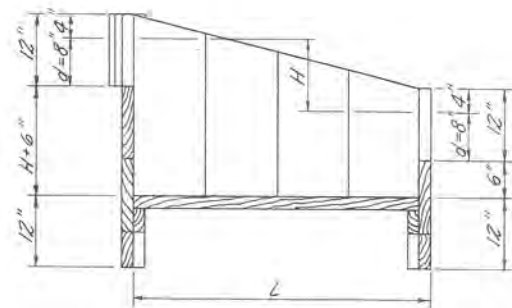
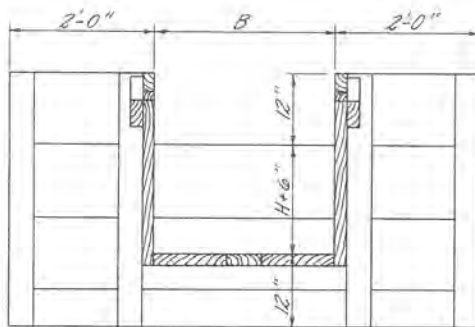
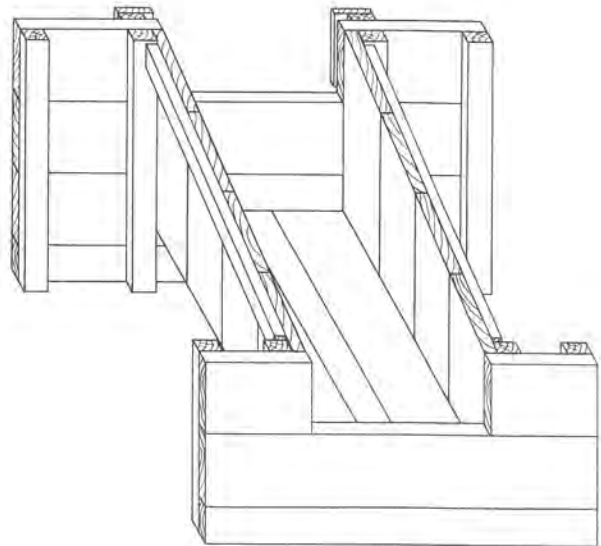
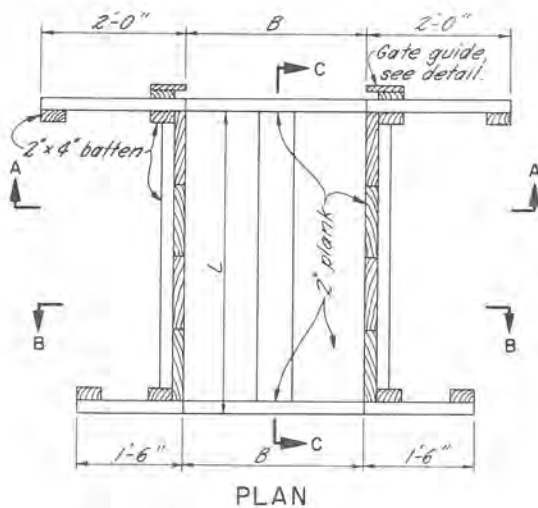
ITEM NO.	MATERIAL	UNIT	QUANTITY
	CONCRETE	CU.YD.	0.40
	MORTAR - 1 PART PORTLAND CEMENT TO 3 PARTS SAND WITH 5 LBS. HYDRATE LIME PER SACK OF CEMENT	CU.YD.	.04
	GROUT	CU.YD.	0.48
1.	8" X 8" X 8" CORNER BLOCKS	EACH	10
2.	8" X 8" X 16" CORNER BLOCKS	EACH	5
3.	8" X 8" X 8" CORNER BLOCKS WITH GATE SLOT	EACH	2
4.	8" X 8" X 16" CORNER BLOCKS WITH GATE SLOT	EACH	2
5.	8" X 8" X 16" STRETCHER BLOCKS	EACH	36
	3/8" DIAMETER REINFORCING BARS	LIN.FT.	53
	NO. 9 BLOCK MESH	LIN.FT.	41

 $Q = 6.0 \text{ cfs}$ 

### CONCRETE BLOCK VERTICAL DROP FOR COHESIVE SOILS

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5.0-19,000.9-2



DIMENSIONS AND CAPACITY				BILL OF MATERIAL GATE GUIDE NOT INCLUDED											
Drop	Apron Length	Width	Capacity	2" x 12" x 16"	2" x 12" x 14"	2" x 12" x 12"	2" x 6" x 16"	2" x 6" x 12"	2" x 6" x 10"	2" x 6" x 8"	2" x 6" x 6"	2" x 4" x 14"	2" x 4" x 12"	2" x 4" x 10"	Board feet per structure
H	L	B	Q												
1'-0"	4'-2"	2'-0"	3.66	1	3			1				2		1	138
1'-0"	4'-2"	2'-6"	4.58		2	2	1					2		1	146
1'-6"	4'-6"	2'-0"	3.66			5					1		2	2	156
1'-6"	4'-6"	2'-6"	4.58	3	1				1				2	2	164
2'-0"	4'-8"	2'-0"	3.66		1	4			1	1		1	1	2	173
2'-0"	4'-8"	2'-6"	4.58	4				1	1			1	1	2	181

Notes:

1. All lumber to be pressure treated and secured with cement coated nails.
2. B = width of opening  
d = depth of water in ditch  
H = height of fall in water surface  
L = length of apron  
Q = capacity in c.f.s.

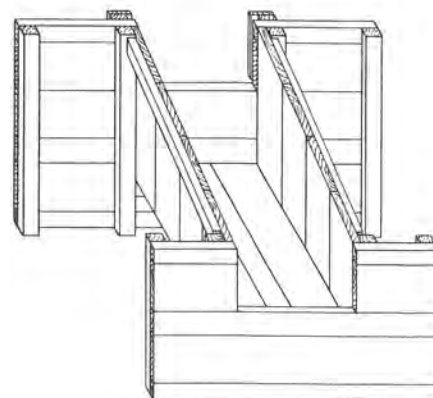
VERTICAL WOOD DROP

d=8" H=1'-0" to 2'-0"

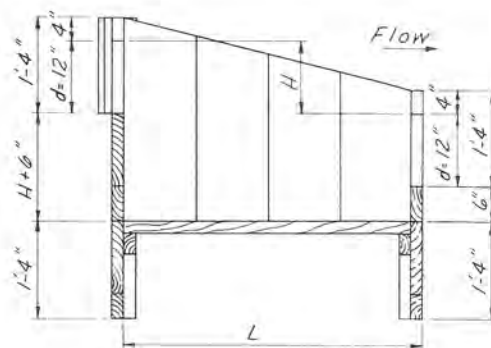
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED CHECKED DATE DRAWING NO.  
1-64 5,0-19,000.10-1

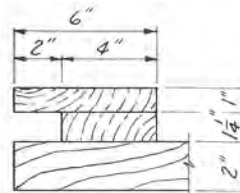




OBLIQUE VIEW



SECTION C-C



### DETAIL OF GATE GUIDE (OPTIONAL)

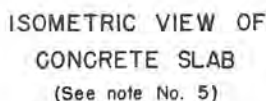
SECTION A-A

SECTION B-B

1. All lumber to be pressure treated and secured with cement coated nails.
2.  $B$  = width of opening  
 $d$  = depth of water in ditch  
 $H$  = height of fall in water surface  
 $L$  = length of apron  
 $Q$  = capacity in c.f.s.

Dimensions and Capacity				Bill of Material Gate guide not included												
Drop	Apron Length	Width	Capacity	2" x 12" x 16"	2" x 12" x 14"	2" x 12" x 12"	2" x 6" x 14"	2" x 6" x 12"	2" x 6" x 10"	2" x 6" x 8"	2" x 6" x 6"	2" x 4" x 16"	2" x 4" x 14"	2" x 4" x 12"	2" x 4" x 10"	Board feet per structure
H	L	B	Q													
1'-0"	4'-2"	2'-0"	6.94	1	3		1					1	1	3		174
1'-0"	4'-2"	2'-6"	8.58	2	2			1	1		1	2	2			184
1'-6"	4'-6"	2'-0"	6.94		4	1					1	1	1	3	1	193
1'-6"	4'-6"	2'-6"	8.58	1	4		1				1	2	2	1	2	208
2'-0"	4'-8"	2'-0"	6.94	2	2	1		1	1		1			3	2	212
2'-0"	4'-8"	2'-6"	8.58	3	2		1	1			1	1	2	2	2	222

VERTICAL WOOD DROP			
d=12" H=1'-0" to 2'-0"			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	50-19,000.10-2



CAPACITY AND LENGTHS REQUIRED

PIPE SIZE RECOMMENDED DESIGN CAPACITY		D=10" AND LENGTH REQUIRED											
		D=10"				D=12"				D=15"			
		1.6 C.F.S.				2.4 C.F.S.				3.7 C.F.S.			
H=R		V	Q MAX.	L <sub>2</sub>	R+L <sub>2</sub>	V	Q MAX.	L <sub>2</sub>	R+L <sub>2</sub>	V	Q MAX.	L <sub>2</sub>	R+L <sub>2</sub>
1'-0"	4.2	2.3	11'-0"	12'-0"	4.3	3.4	11'-0"	12'-0"	4.5	5.5	11'-0"	12'-0"	
1'-6"	5.1	2.8	12'-6"	14'-0"	5.2	4.1	12'-6"	14'-0"	5.4	6.6	12'-6"	14'-0"	
2'-0"	5.9	3.2	14'-0"	16'-0"	6.0	4.7	14'-0"	16'-0"	5.7	7.5	14'-0"	16'-0"	
2'-6"	6.4	3.5	13'-6"	16'-0"	6.6	5.2	13'-6"	16'-0"	6.6	8.1	13'-6"	16'-0"	
3'-0"	6.8	3.7	15'-0"	18'-0"	6.6	5.2	15'-0"	18'-0"	6.6	8.1	15'-0"	18'-0"	

## NOTES

1. SELECT A PIPE SIZE THAT WILL PROVIDE A GREATER CAPACITY THAN IS REQUIRED TO DISCHARGE THE NORMAL STREAM USED WHEN IRRIGATING. TRY TO KEEP THE VELOCITY IN THE PIPE BELOW 3 FPS BASED ON NORMAL IRRIGATING STREAM.
2. WHEN THE CORRUGATED METAL PIPE DROP IS USED AT A DITCH CROSSING, INCREASE WIDTH OF TOP OF DAM AND DIMENSION  $L_2$  BY 8'-0".
3. THE DROP (H) FOR ANY SPECIFIC STRUCTURE CAN BE INCREASED 3 INCHES BY PLACING THE TOP OF THE RISER PIPE 3 INCHES BELOW THE TOP OF THE CONCRETE FLOOR OF THE INLET. THE THICKNESS OF THE FLOOR SLAB ADJACENT TO THE PIPE SHOULD BE INCREASED 3 INCHES TO MAKE A WATERTIGHT CONNECTION WITH THE PIPE. THE INLET TO THE PIPE SHOULD BE ROUNDED TO A 3 INCH RADIUS TO SAVE FORMING AND IMPROVE THE EFFICIENCY OF THE INLET.
4. THE DROP STRUCTURE IS FORMED BY CUTTING A STANDARD LENGTH OF CORRUGATED METAL PIPE, WHICH IS MANUFACTURED IN MULTIPLES OF 2 FT. IN LENGTH, ON A 45° ANGLE AND WELDING THE CUT JOINTS TOGETHER TO FORM A 90° BEND. PIPE TO BE 16 GA. CORRUGATED METAL. JOINT BETWEEN HORIZONTAL AND VERTICAL PIECES OF PIPE TO BE BUTT WELDED AND WATERTIGHT.
5. SIX INCH HAND PLACED RIP-RAP MAY BE SUBSTITUTED FOR CONCRETE SLAB.

## NOMENCLATURE

d - DEPTH OF WATER IN DITCH  
F - FREEBOARD IN DITCH  
D - DIAMETER OF PIPE  
R - LENGTH OF VERTICAL PIPE ALONG CENTER LINE  
L<sub>2</sub> - LENGTH OF HORIZONTAL PIPE ALONG CENTER LINE  
V - VELOCITY OF PIPE - FPS  
Q - DISCHARGE THROUGH PIPE - C.F.S.  
H - DROP OF WATER SURFACE

### TABLE OF CONCRETE QUANTITIES

D=10"	0.25 CU. YDS.
D=12"	0.26 CU. YDS.
D=15"	0.29 CU. YDS.

CORRUGATED METAL PIPE DROP $d = 12''$ U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPLET

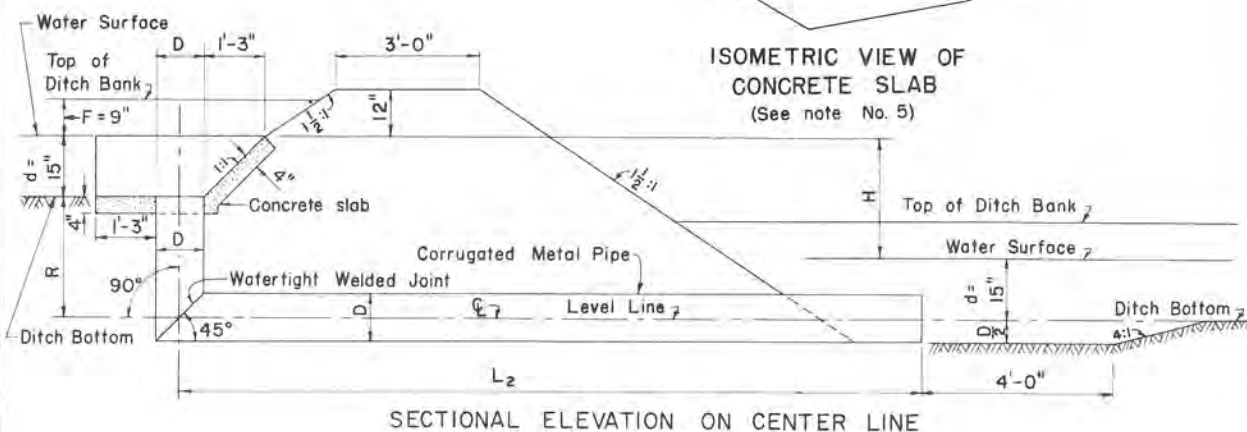
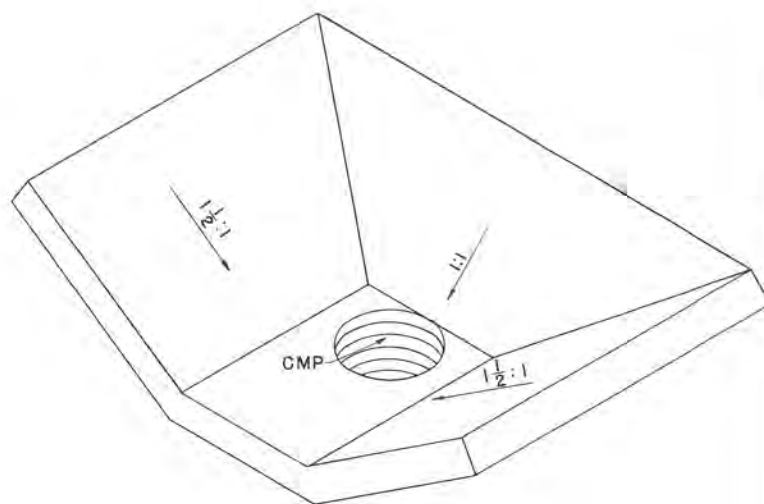
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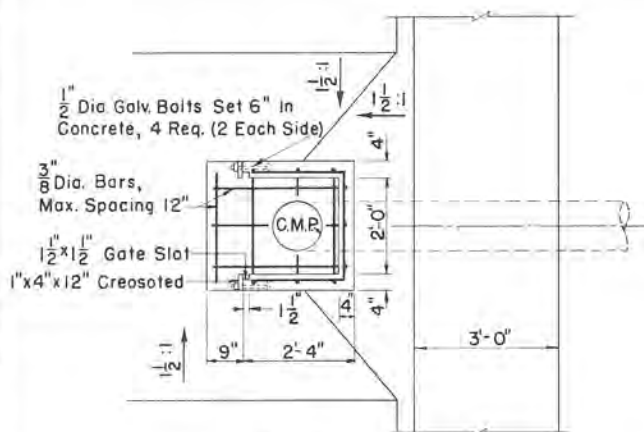
DRIVING INC.

1-64

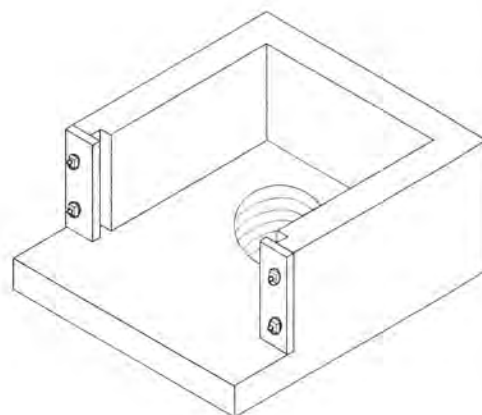
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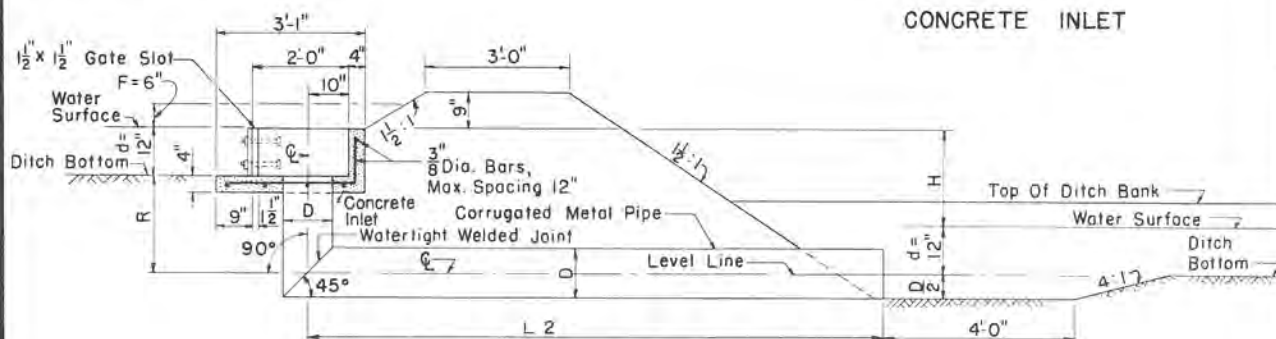
CORRUGATED METAL PIPE DROP			
d = 15"			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPLETED	CHECKED	DATE	DRAINING NO.
		1-64	5,0-19,000,11-2



PLAN



ISOMETRIC VIEW OF  
CONCRETE INLET



SECTIONAL ELEVATION ON CENTERLINE

CAPACITY AND LENGTHS REQUIRED

PIPE SIZE	D 10"					D 12"					D 15"					
RECOMMENDED DESIGN CAPACITY	1.6 C.F.S.					2.4 C.F.S.					3.7 C.F.S.					
H = R	V	Q	MAX.	L <sub>2</sub>	R+L <sub>2</sub>	V	Q	MAX.	L <sub>2</sub>	R+L <sub>2</sub>	V	Q	MAX.	L <sub>2</sub>	R+L <sub>2</sub>	
1'-0"	4.2	2.3	11'-0"	12'-0"	4.3	3.4	11'-0"	12'-0"	4.5	5.5	11'-0"	12'-0"	4.5	5.5	11'-0"	12'-0"
1'-6"	5.1	2.8	12'-6"	14'-0"	5.2	4.1	12'-6"	14'-0"	5.4	6.6	12'-6"	14'-0"	5.4	6.6	12'-6"	14'-0"
2'-0"	5.9	3.2	12'-0"	14'-0"	6.0	4.7	12'-0"	14'-0"	6.1	7.5	12'-0"	14'-0"	6.1	7.5	12'-0"	14'-0"
2'-6"	6.4	3.5	13'-6"	16'-0"	6.6	5.2	13'-6"	16'-0"	6.6	8.1	13'-6"	16'-0"	6.6	8.1	13'-6"	16'-0"
3'-0"	6.8	3.7	15'-0"	18'-0"	6.6	5.2	15'-0"	18'-0"	6.6	8.1	15'-0"	18'-0"	6.6	8.1	15'-0"	18'-0"

NOTES

1. SELECT A PIPE SIZE THAT WILL PROVIDE A GREATER CAPACITY THAN IS REQUIRED TO DISCHARGE THE NORMAL STREAM USED WHEN IRRIGATING. TRY TO KEEP THE VELOCITY IN THE PIPE BELOW 3 FPS BASED ON NORMAL IRRIGATION STREAM.
2. WHEN THE CORRUGATED METAL PIPE IS USED AT A DITCH CROSSING, INCREASE WIDTH OF TOP OF DAM AND DIMENSION L<sub>2</sub> BY 8'-0".
3. THE DROP (H) FOR ANY SPECIFIC STRUCTURE CAN BE INCREASED 3 INCHES BY PLACING THE TOP OF THE RISER PIPE 3 INCHES BELOW THE TOP OF THE CONCRETE FLOOR OF THE INLET. THE THICKNESS OF THE FLOOR SLAB ADJACENT TO THE PIPE SHOULD BE INCREASED 3 INCHES TO MAKE A WATERTIGHT CONNECTION WITH THE PIPE. THE INLET TO THE PIPE SHOULD BE ROUNDED TO A 3 INCH RADIUS TO SAVE FORMING AND IMPROVE THE EFFICIENCY OF THE INLET.
4. THE DROP STRUCTURE IS FORMED BY CUTTING A STANDARD LENGTH OF CORRUGATED METAL PIPE, WHICH IS MANUFACTURED IN MULTIPLES OF 2 FT. IN LENGTH, ON A 45° ANGLE AND WELDING THE CUT JOINTS TOGETHER TO FORM A 90° BEND. PIPE TO BE 16 GA. CORRUGATED METAL. JOINT BETWEEN HORIZONTAL AND VERTICAL PIECES OF PIPE TO BE BUTT WELDED AND WATERTIGHT.

TABLE OF QUANTITIES

ITEM	DESCRIPTION	AMOUNT		
		D = 10"	D = 12"	D = 15"
CONCRETE		0.18 CU.YDS.	0.17 CU.YDS.	0.17 CU.YDS.
REINFORCING STEEL	3/8" DIA. BARS	35 LIN.FT.	35 LIN.FT.	35 LIN.FT.
	1" X 4" X 12" CREOSOTED BOARDS	2	2	2
	GALV. BOLTS 1/2" DIA. 8" LONG	4	4	4
	GALV. WASHERS 1/2" DIA.	4	4	4

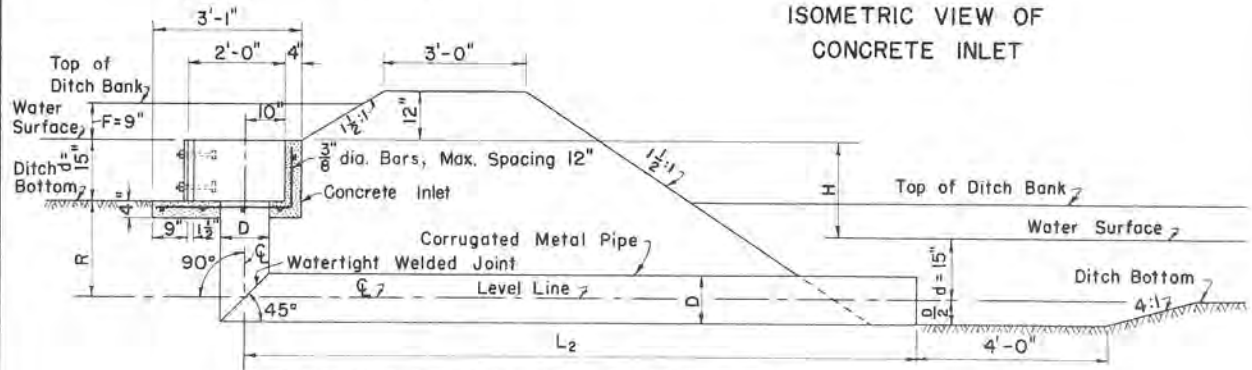
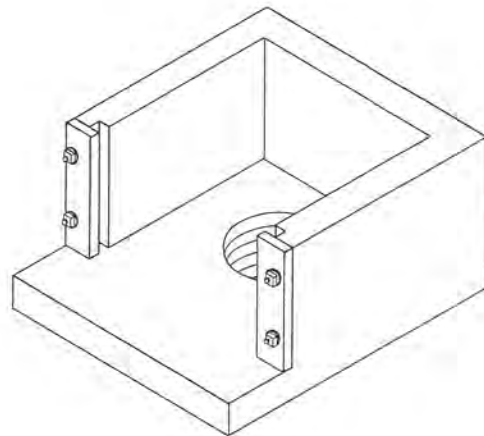
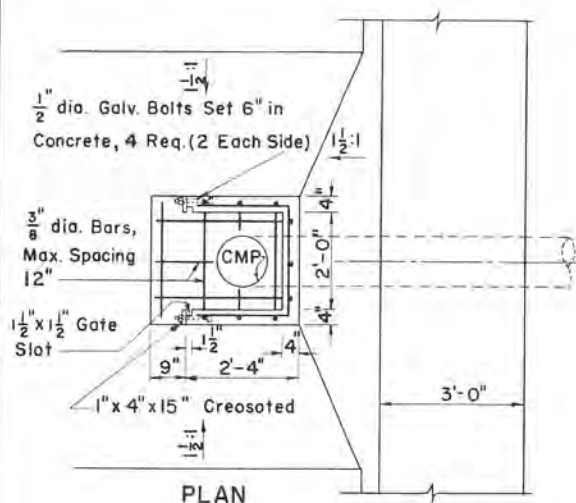
NOMENCLATURE

- d - DEPTH OF WATER IN DITCH  
F - FREEBOARD IN DITCH  
D - DIAMETER OF PIPE  
R - LENGTH OF VERTICAL PIPE ALONG CENTER LINE  
L<sub>2</sub> - LENGTH OF HORIZONTAL PIPE ALONG CENTER LINE  
V - VELOCITY IN PIPE - FPS.  
Q - DISCHARGE THROUGH PIPE - C.F.S.  
H - DROP OF WATER SURFACE

CORRUGATED METAL PIPE DROP  
WITH CHECK INLET  
d=12"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000,11-3



SECTIONAL ELEVATION ON CENTER LINE

CAPACITY AND LENGTHS REQUIRED

PIPE SIZE RECOMMENDED DESIGN CAPACITY	D = 10"				D = 12"				D = 15"			
	1.6 C.F.S.				2.4 C.F.S.				3.7 C.F.S.			
H = R	V	Q MAX.	L <sub>2</sub>	R+L <sub>2</sub>	V	Q MAX.	L <sub>2</sub>	R+L <sub>2</sub>	V	Q MAX.	L <sub>2</sub>	R+L <sub>2</sub>
1'-0"	4.2	2.3	13'-0"	14'-0"	4.3	3.4	13'-0"	14'-0"	4.5	5.5	13'-0"	14'-0"
1'-6"	5.1	2.8	12'-6"	14'-0"	5.2	4.1	12'-6"	14'-0"	5.4	6.6	12'-6"	14'-0"
2'-0"	5.9	3.2	14'-0"	16'-0"	6.0	4.7	14'-0"	16'-0"	6.1	7.5	14'-0"	16'-0"
2'-6"	6.4	3.5	13'-6"	16'-0"	6.6	5.2	13'-6"	16'-0"	6.8	8.4	15'-6"	18'-0"
3'-0"	6.8	3.7	15'-0"	18'-0"	7.1	5.6	15'-0"	18'-0"	7.4	9.1	15'-0"	18'-0"

NOTES

1. SELECT A PIPE SIZE THAT WILL PROVIDE A GREATER CAPACITY THAN IS REQUIRED TO DISCHARGE THE NORMAL STREAM USED WHEN IRRIGATING. TRY TO KEEP THE VELOCITY IN THE PIPE BELOW 3 FPS BASED ON NORMAL IRRIGATION STREAM.
2. WHEN THE CORRUGATED METAL PIPE DROP IS USED AT A DITCH CROSSING, INCREASE WIDTH OF TOP OF DAM AND DIMENSION L<sub>2</sub> BY 8'-0".
3. THE DROP (H) FOR ANY SPECIFIC STRUCTURE CAN BE INCREASED 3 INCHES BY PLACING THE TOP OF THE RISER PIPE 3 INCHES BELOW THE TOP OF THE CONCRETE FLOOR OF THE INLET. THE THICKNESS OF THE FLOOR SLAB ADJACENT TO THE PIPE SHOULD BE INCREASED 3 INCHES TO MAKE A WATERTIGHT CONNECTION WITH THE PIPE. THE INLET TO THE PIPE SHOULD BE ROUNDED TO A 3 INCH RADIUS TO SAVE FORMING AND IMPROVE THE EFFICIENCY OF THE INLET.
4. THE DROP STRUCTURE IS FORMED BY CUTTING A STANDARD LENGTH OF CORRUGATED METAL PIPE, WHICH IS MANUFACTURED IN MULTIPLES OF 2 FT. IN LENGTH, ON A 45° ANGLE AND WELDING THE CUT JOINTS TOGETHER TO FORM A 90° BEND. PIPE TO BE 16 GA. CORRUGATED METAL. JOINT BETWEEN HORIZONTAL AND VERTICAL PIECES OF PIPE TO BE BUTT WELDED AND WATERTIGHT.

TABLE OF QUANTITIES

ITEM	DESCRIPTION	AMOUNT		
		D = 10"	D = 12"	D = 15"
CONCRETE		0.20 CU.YDS.	0.20 CU.YDS.	0.19 CU.YDS.
REINFORCING STEEL	3/8" DIA. BARS	37 LIN.FT.	37 LIN.FT.	37 LIN.FT.
1" X 4" X 15" CREOSOTED BOARDS		2	2	2
GALV. BOLTS	1/2" DIA. 8" LONG	4	4	4
GALV. WASHERS	1/2" DIA.	4	4	4

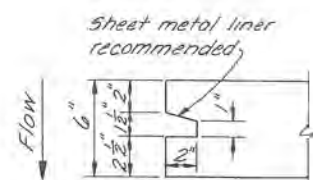
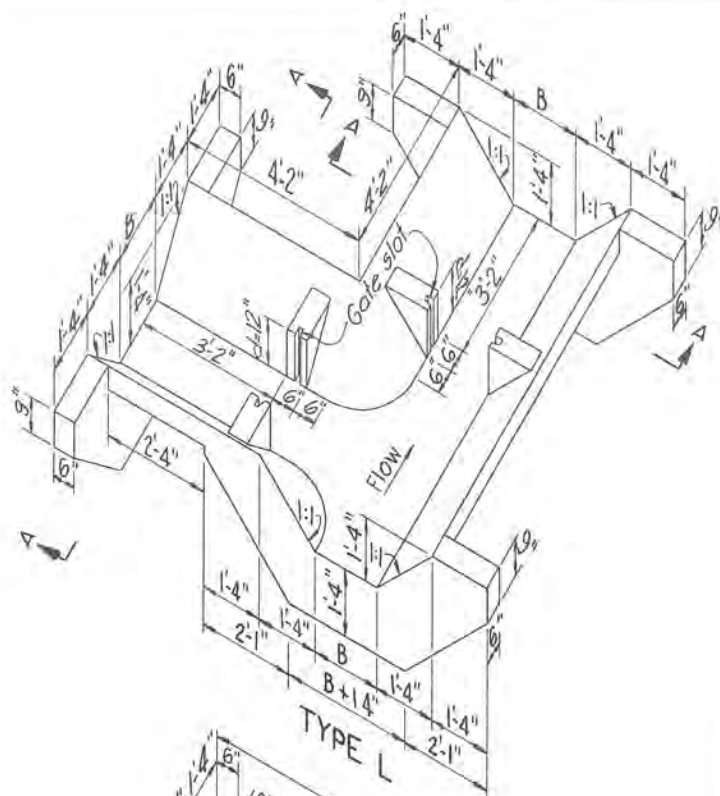
NOMENCLATURE

- d - DEPTH OF WATER IN DITCH  
 F - FREEBOARD IN DITCH  
 D - DIAMETER OF PIPE  
 R - LENGTH OF VERTICAL PIPE ALONG CENTER LINE  
 L<sub>2</sub> - LENGTH OF HORIZONTAL PIPE ALONG CENTER LINE  
 V - VELOCITY IN PIPE - FPS  
 Q - DISCHARGE THROUGH PIPE - C.F.S.  
 H - DROP OF WATER SURFACE

CORRUGATED METAL PIPE DROP  
WITH CHECK INLET  
d = 15"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

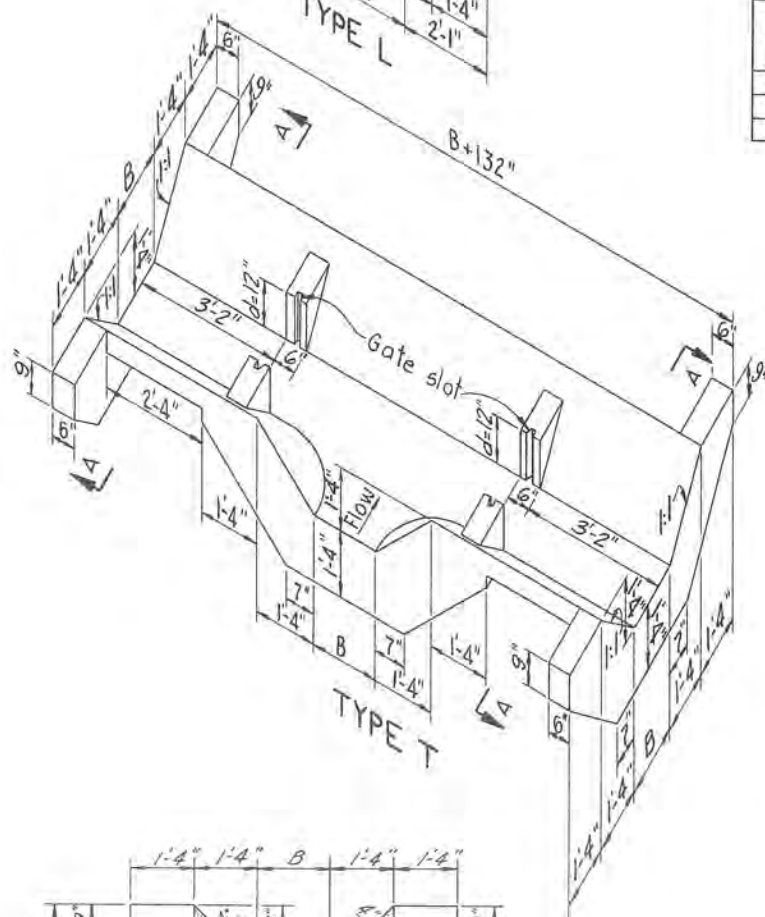
COMPILED CHECKED DATE 1-64 DRAWING NO. 5,0-19,000.11-4



DETAIL OF GATE SLOT

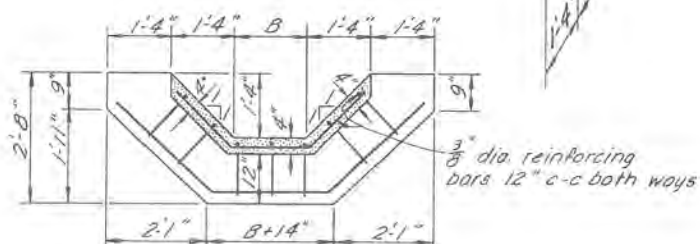
TABLE OF QUANTITIES  
FOR DIVISION BOXES

B	TYPE L STRUCTURE		TYPE T STRUCTURE	
	Concrete Cu. Yd.	Steel Lin. Ft.	Concrete Cu. Yd.	Steel Lin. Ft.
12	1.30	174	1.29	168
18	1.44	205	1.42	198
24	1.57	216	1.56	209



Notes:

1. Reinforcement to be placed in center of slabs and walls
2. 6"x6" No. 10 wire mesh may be used in place of 3/8" dia. reinforcing bars.
3. Nomenclature:  
d = depth of water in ditch  
B = bottom width of structure channel



SECTIONAL ELEVATION A-A

CONCRETE TRAPEZOIDAL DIVISION BOX

d=12", B=12", 1'-6", & 2'-0"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.12-1

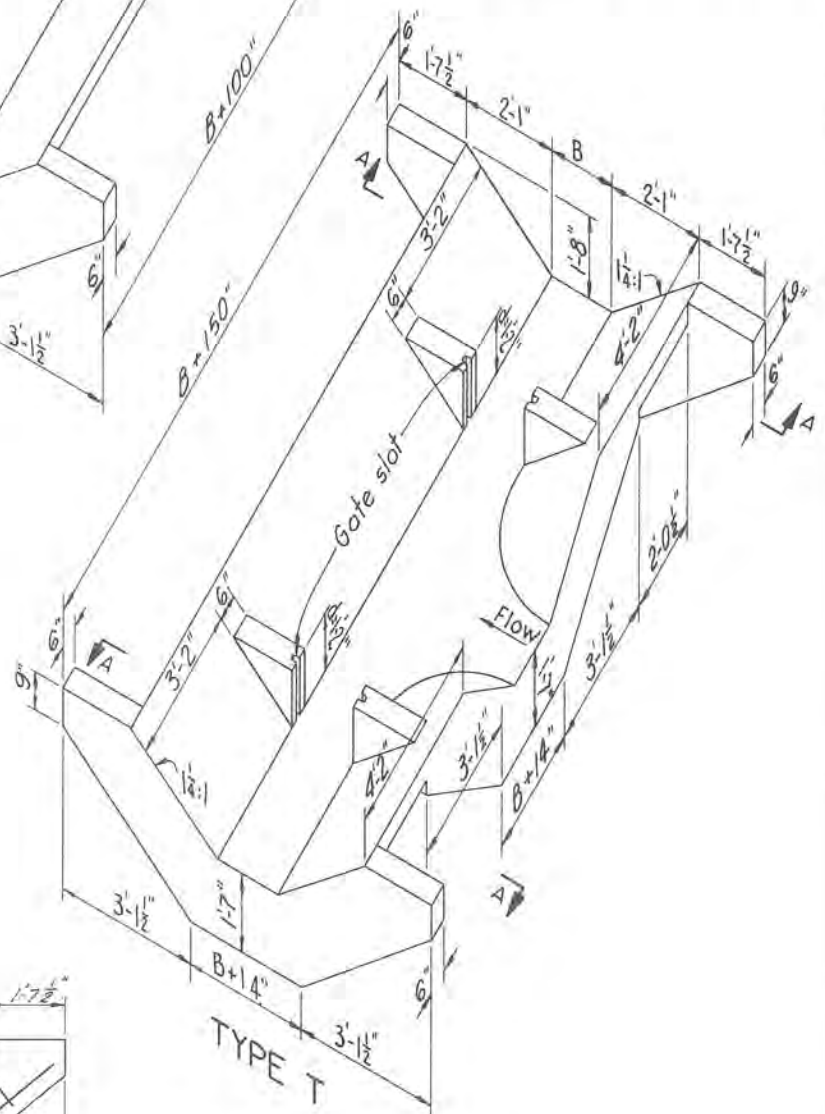
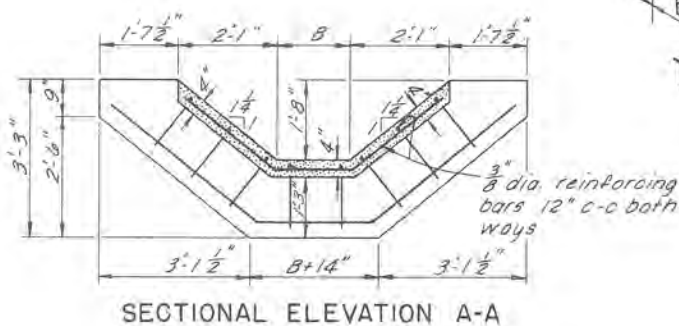
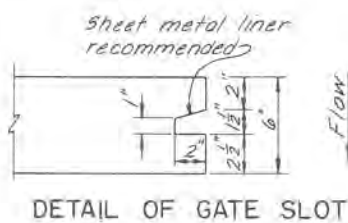
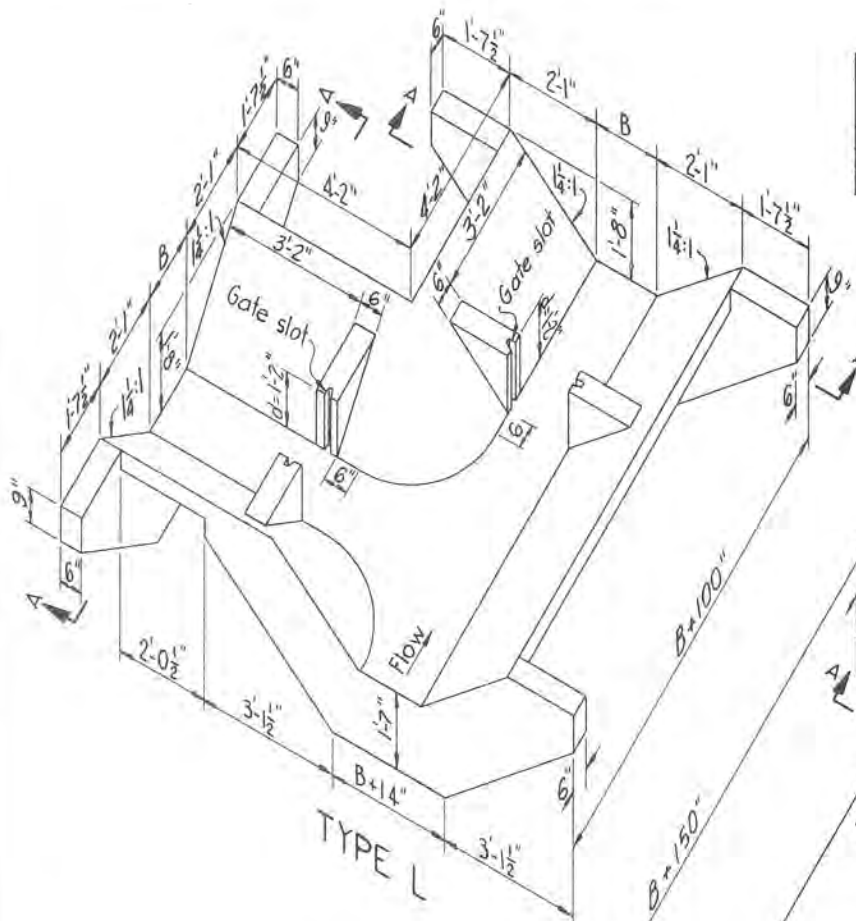


TABLE OF QUANTITIES FOR  
DIVISION BOX

B	TYPE L STRUCTURE		TYPE T STRUCTURE	
	Concrete Cu. Yd.	Steel Lin. Ft.	Concrete Cu. Yd.	Steel Lin. Ft.
12	1.57	223	1.56	222
18	1.72	257	1.70	256
24	1.87	269	1.86	269

Notes:

1. Reinforcement to be placed in center of slabs.
2. 6" x 6" No. 10 wire mesh may be used in place of  $\frac{3}{8}$ " dia. reinforcing bars.
3. Nomenclature:  
d = depth of water in ditch.  
B = bottom width of structure channel



CONCRETE TRAPEZOIDAL DIVISION BOX			
d=1'-2", B=12", 1'-6" & 2'-0"			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.12-2

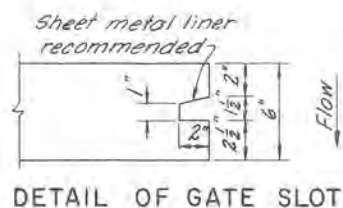
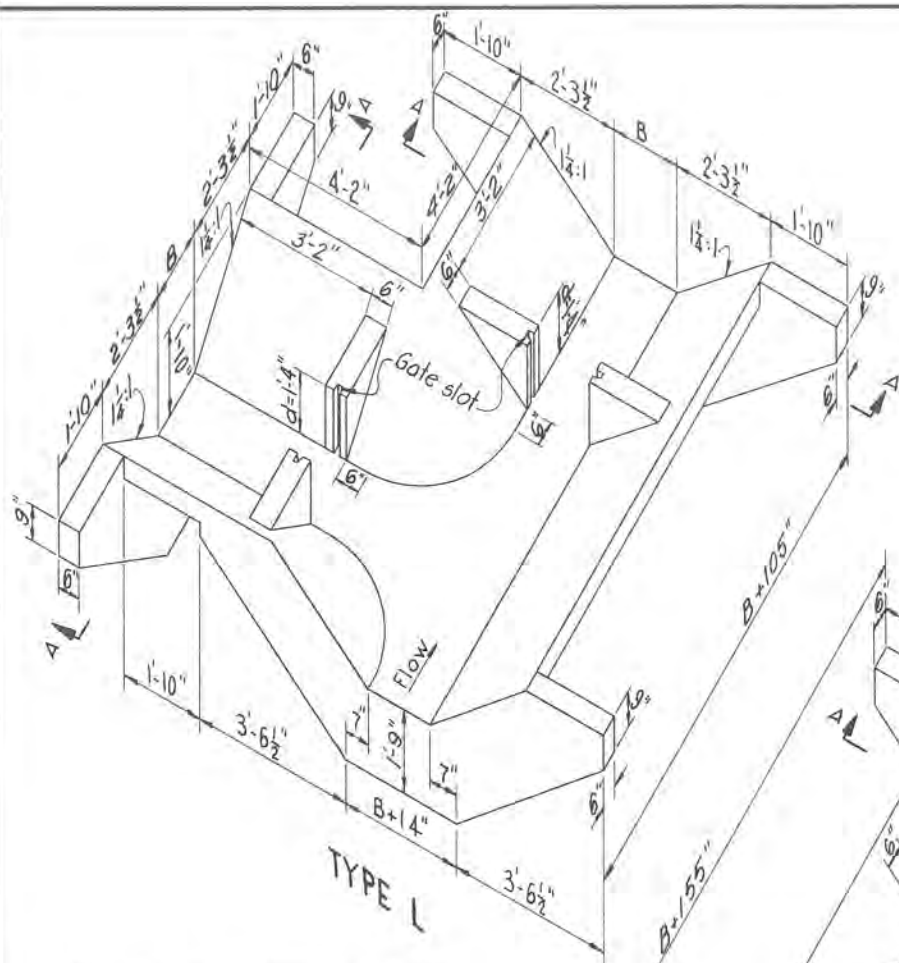
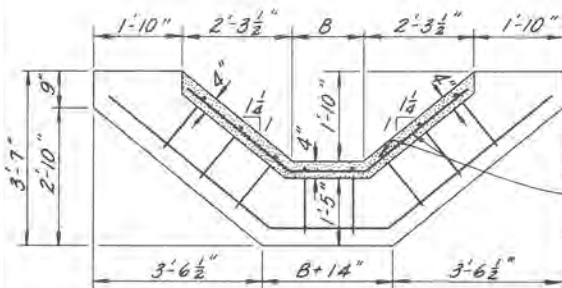


TABLE OF QUANTITIES FOR  
DIVISION BOX

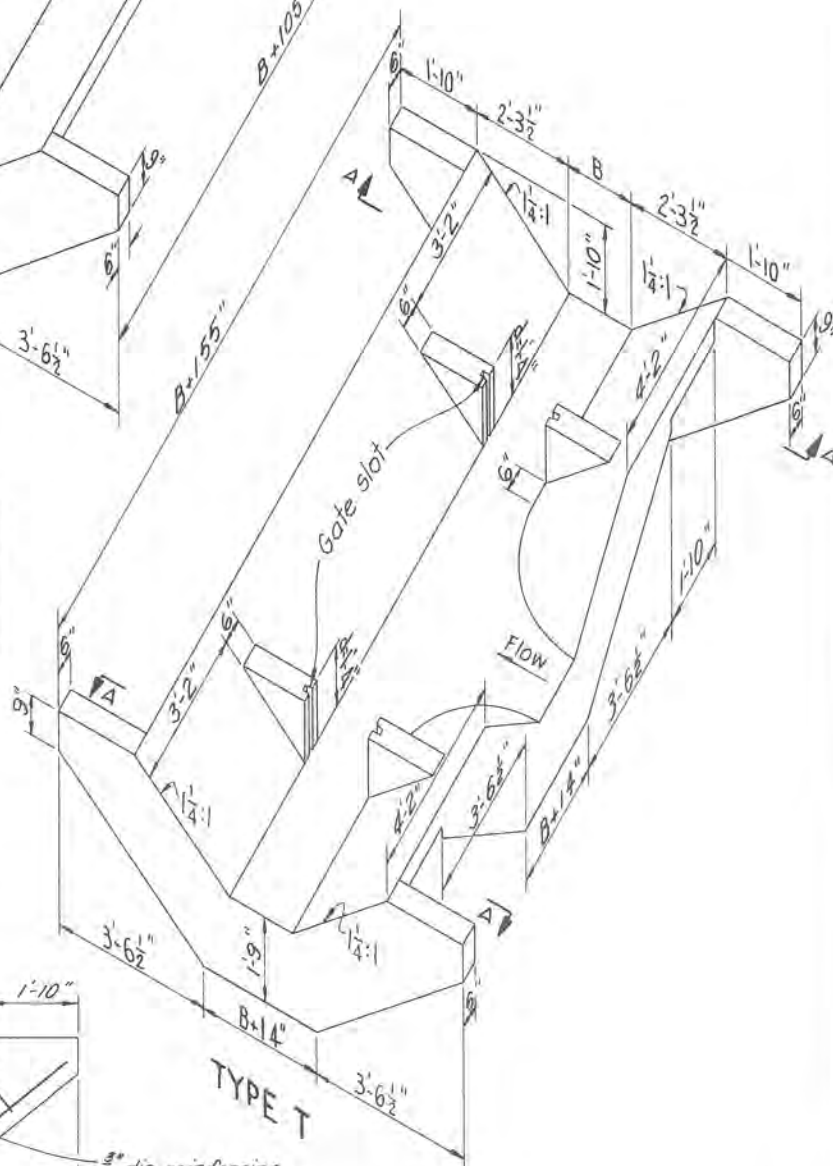
	TYPE L STRUCTURE		TYPE T STRUCTURE	
B In.	Concrete Cu. Yds.	Steel Lin. Ft.	Concrete Cu. Yds.	Steel Lin. Ft.
12	1.81	239	1.80	239
18	1.97	274	1.96	273
24	2.14	287	2.12	286

Notes:

1. Reinforcement to be placed in center of slabs.
2. 6" x 6" No. 10 wire mesh may be used in place of  $\frac{3}{8}$ " diameter reinforcing bars.
3. Nomenclature:  
d = depth of water in ditch  
B = bottom width of structure channel



SECTIONAL ELEVATION A-A



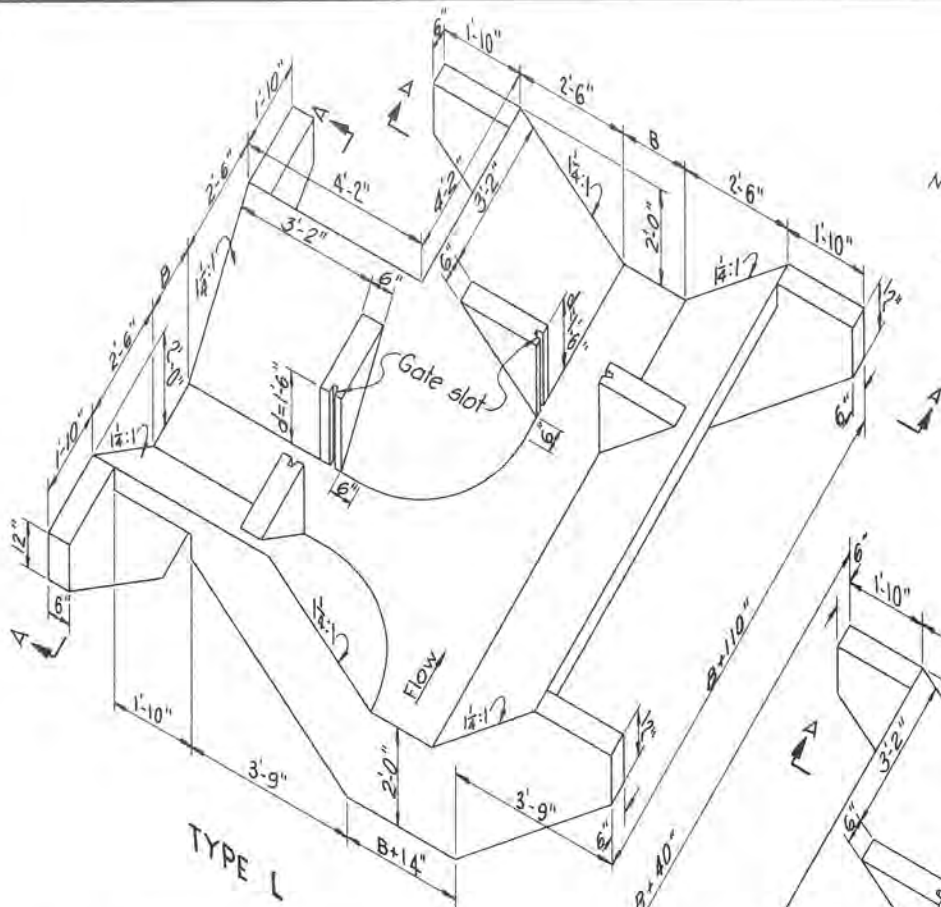
$\frac{3}{8}$ " dia. reinforcing  
bars 12" c-c  
both ways

CONCRETE TRAPEZOIDAL DIVISION BOX

d = 1'-4" B = 12" 1'-6" & 2'-0"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.12-3

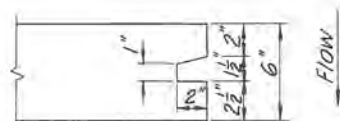


#### Notes

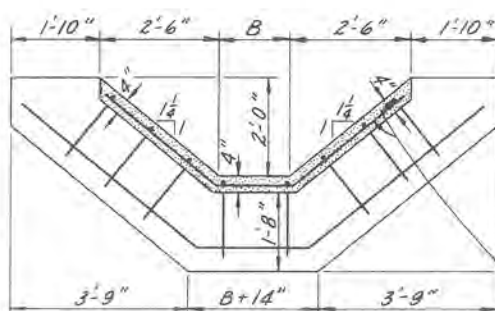
1. Reinforcement to be placed in center of slabs.
2. 6" x 6" No. 10 wire mesh may be used in place of  $\frac{3}{8}$ " dia. reinforcing bars.
3. Nomenclature:  
d = depth of water in ditch  
B = bottom width of structure channel

TABLE OF QUANTITIES FOR  
DIVISION BOX

B In.	TYPE L STRUCTURE		TYPE T STRUCTURE	
	Concrete Cu Yds.	Steel Lin. Ft.	Concrete Cu Yds.	Steel Lin. Ft.
12	2.01	280	1.99	280
18	2.17	317	2.16	316
24	2.34	330	2.33	329
36	2.52	383	2.50	383



DETAIL OF GATE SLOT



SECTIONAL ELEVATION A-A

TYPE T

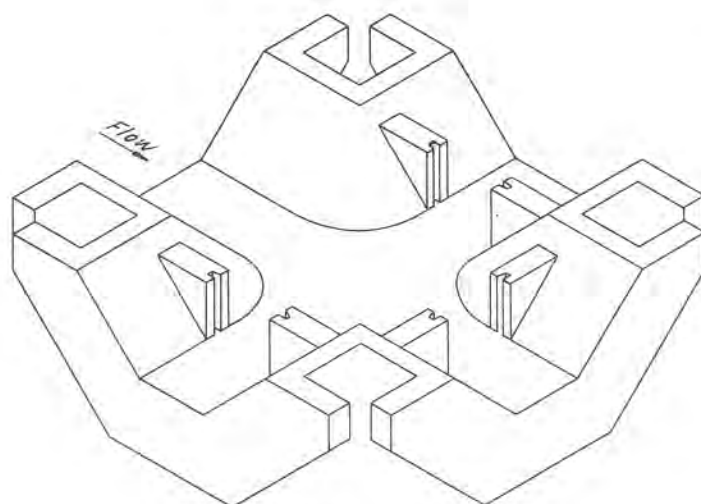
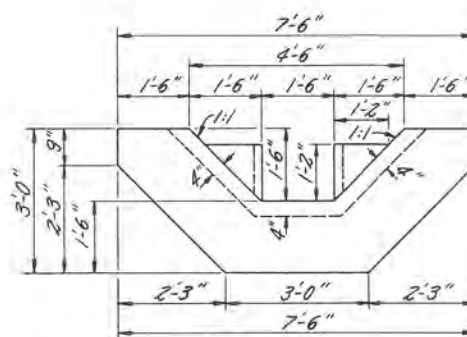
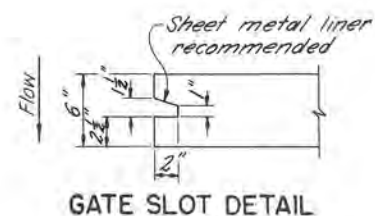
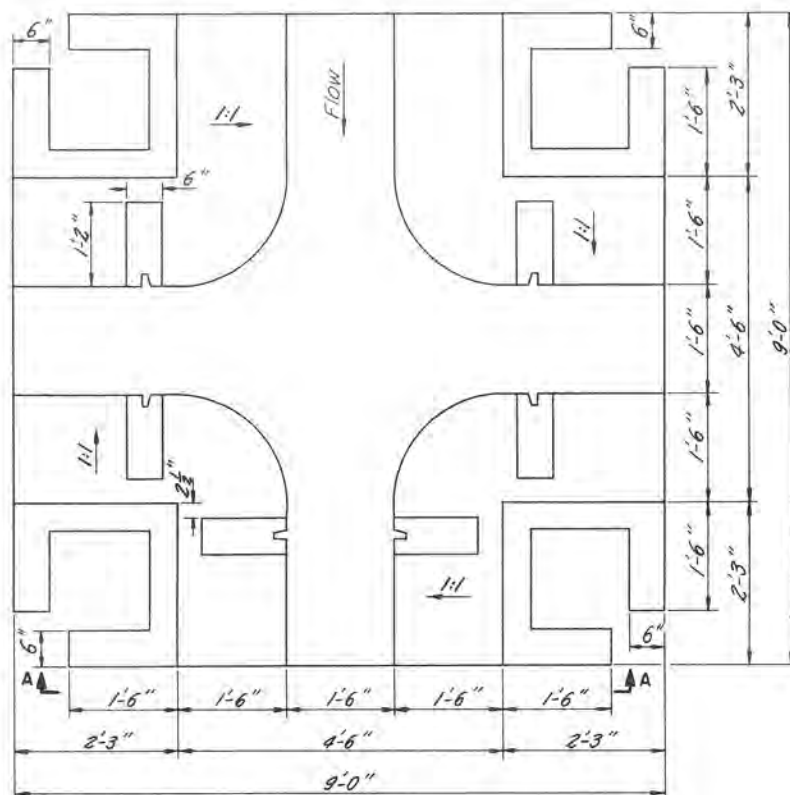
$\frac{3}{8}$ " dia. reinforcing  
bars 12" c-c both  
ways.

#### CONCRETE TRAPEZOIDAL DIVISION BOX

d = 1'-6" B = 12", 1'-6", 2'-0" & 3'-0"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.12-4



Notes:

1. Concrete quantity = 1.78 cu. yd.
2. Reinforcement to be  $\frac{3}{8}$ " dia. reinforcing bars on 12" c-c placed in center of concrete slab.  
If structure is used at the crossing of two concrete lined ditches, cutoff walls and reinforcing steel not required.

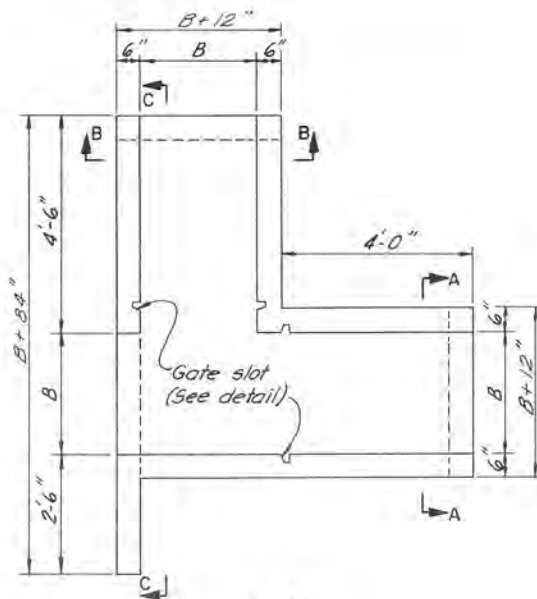
ISOMETRIC VIEW

### CONCRETE TRAPEZOIDAL DIVISION BOX

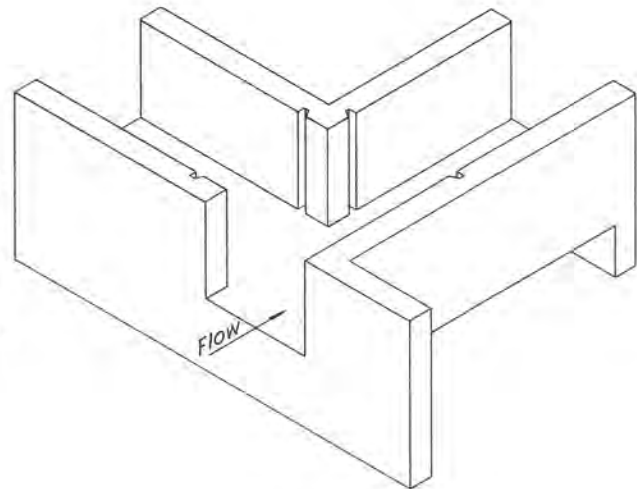
$$d = l' - 2'', \quad B = l' - 6''$$

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

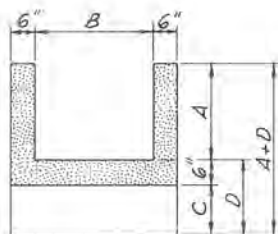
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	50-19,000-12-5



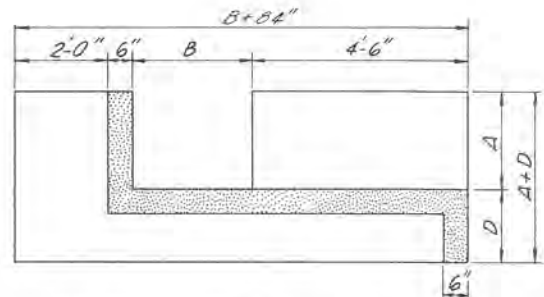
PLAN



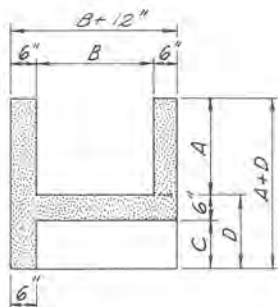
ISOMETRIC VIEW



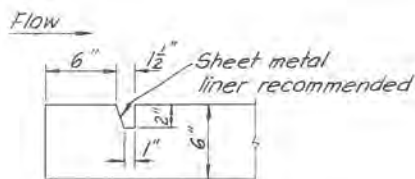
SECTIONAL ELEVATION A-A



SECTIONAL ELEVATION C-C



SECTIONAL ELEVATION B-B



DETAIL OF GATE SLOT

TABLE OF DIMENSIONS AND QUANTITIES

A	B	C	D	Concrete Cu. Yd.	Steel Lin. Ft.
2'-0"	2'-6"	1'-0"	1'-6"	1.87	224
2'-0"	3'-6"	1'-6"	2'-0"	2.46	276
2'-0"	4'-6"	1'-6"	2'-0"	2.91	324
3'-0"	2'-6"	1'-6"	2'-0"	2.46	285
3'-0"	3'-6"	1'-6"	2'-0"	2.89	332
3'-0"	4'-6"	1'-6"	2'-0"	3.37	382

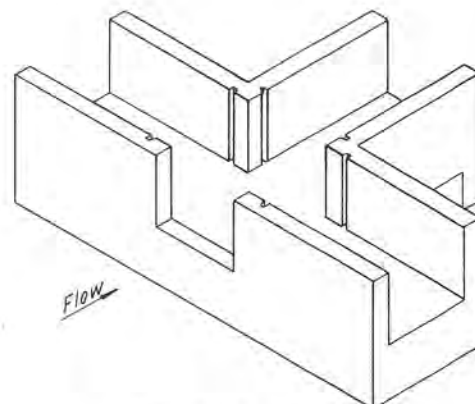
A = Height of sidewalls  
 B = Width of flow pattern  
 C = Depth of wall below slab  
 D = Depth of wall including slab

Note:  
 Reinforcement to be  $\frac{3}{8}$ " dia. reinforcing bars on 12" c-c placed in center of concrete slab 6" x 6". No. 10 wire mesh may be used in place of  $\frac{3}{8}$ " dia. reinforcing bars.

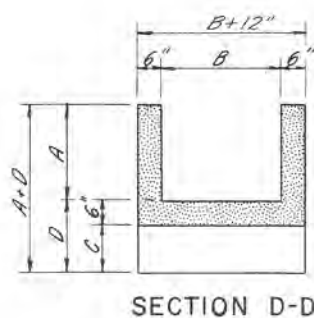
CONCRETE RECTANGULAR  
DIVISION BOX

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

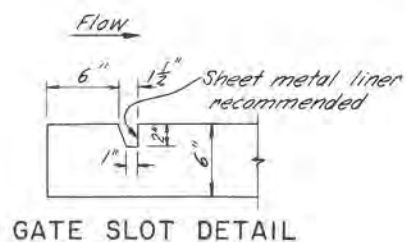
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.13-1



ISOMETRIC VIEW



SECTION D-D



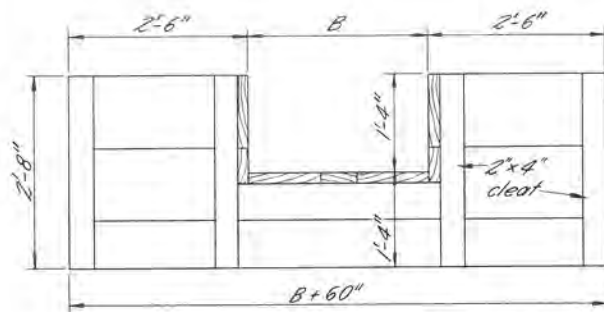
GATE SLOT DETAIL

$A$  = height of sidewalls  
 $B$  = width of flow pattern  
 $C$  = depth of wall below slab  
 $D$  = depth of wall including slab

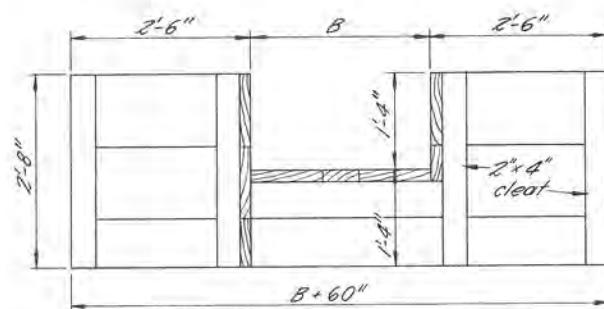
A	B	C	D	CONCRETE CU. YD.	STEEL LIN. FT.
2'-0"	2'-6"	1'-0"	1'-6"	2.36	265
3'-0"	2'-6"	1'-6"	2'-0"	3.03	340
2'-0"	3'-6"	1'-6"	2'-0"	3.03	348
3'-0"	3'-6"	1'-6"	2'-0"	3.51	400
2'-0"	4'-6"	1'-6"	2'-0"	3.53	410
3'-0"	4'-6"	1'-6"	2'-0"	4.03	462

COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.13-2

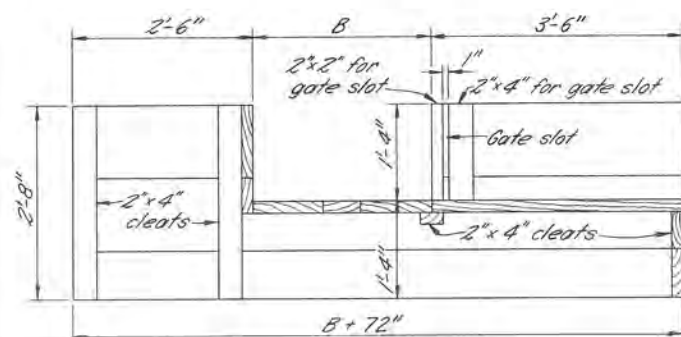




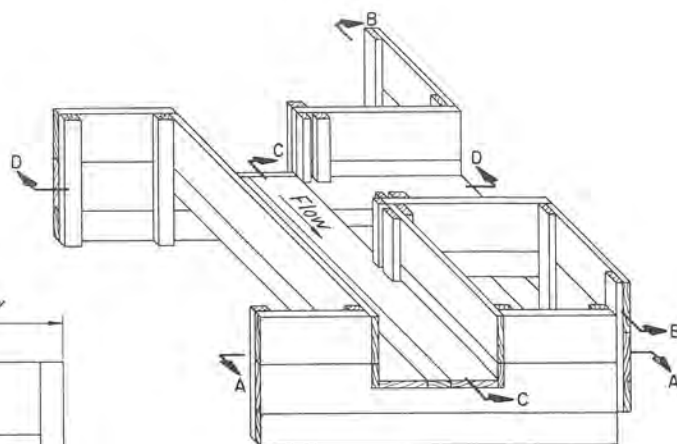
SECTIONAL ELEVATION A-A



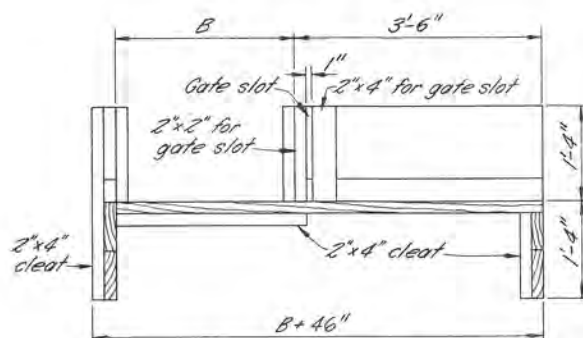
SECTIONAL ELEVATION B-B



SECTIONAL ELEVATION D-D



OBLIQUE VIEW



SECTIONAL ELEVATION C-C

TABLE OF QUANTITIES

B	B.F.M.
2'-6"	219
3'-0"	235
3'-6"	253

Notes:

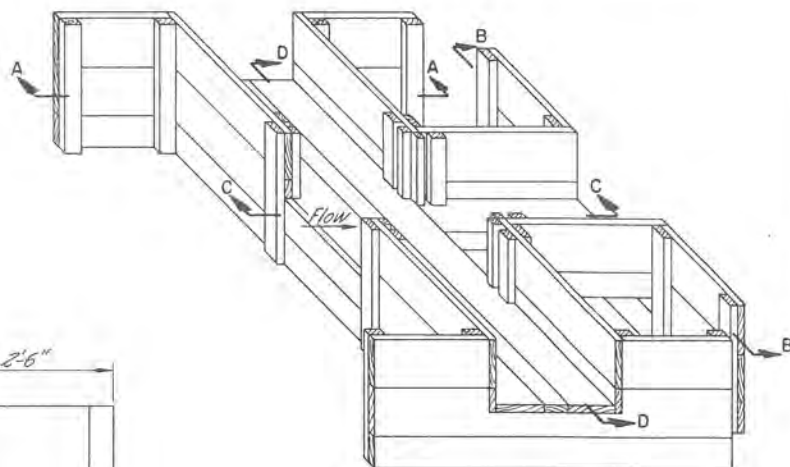
1. All lumber to be 2" full dimension pressure treated secured with cement coated nails.
2. Nomenclature:  
B = width of structure.  
d = depth of water in ditch.

TWO WAY WOOD DIVISION BOX

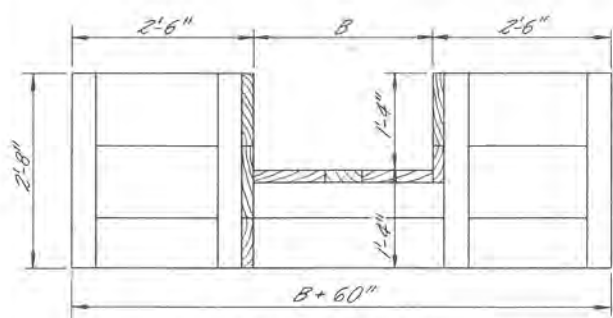
B = 2'-6", 3'-0", 3'-6" d = 12"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

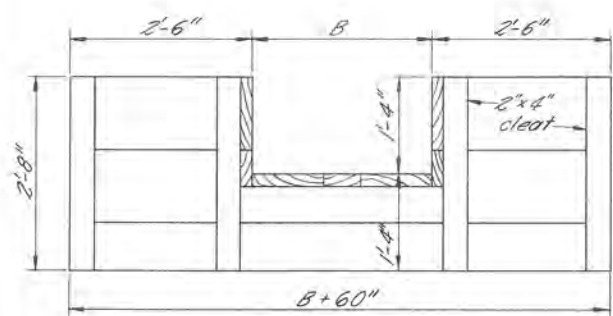
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	50-19,000.14-1



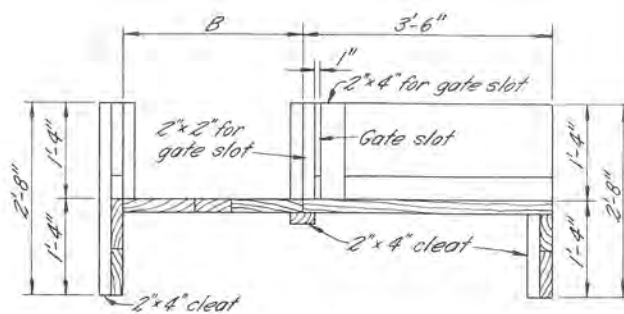
OBLIQUE VIEW



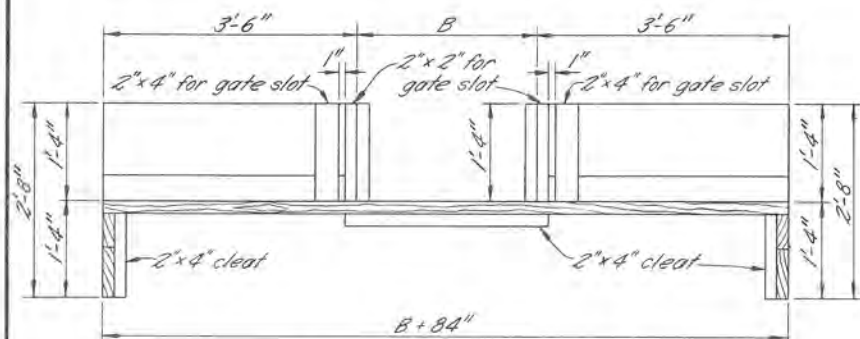
SECTIONAL ELEVATION A-A



SECTIONAL ELEVATION B-B



SECTIONAL ELEVATION C-C



SECTIONAL ELEVATION D-D

TABLE OF QUANTITIES

B	B.F.M.
2'-6"	281
3'-0"	302
3'-6"	325

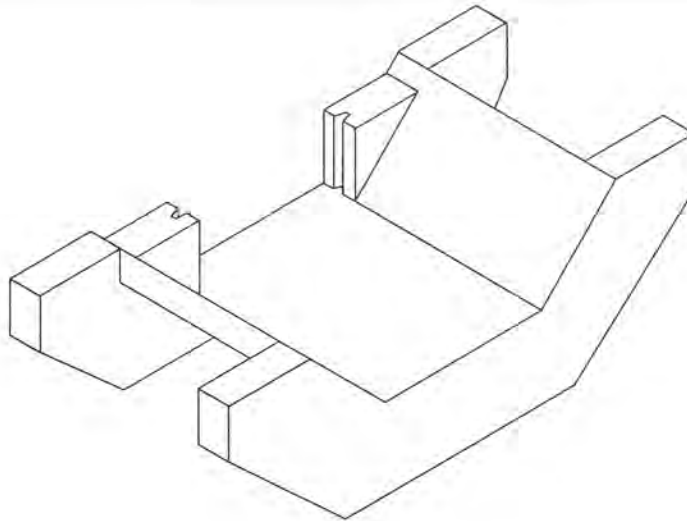
Notes:

1. All lumber to be 2" full dimension pressure treated, secured with cement coated nails.
2. Nomenclature:  
B = width of structure.  
d = depth of water in ditch.

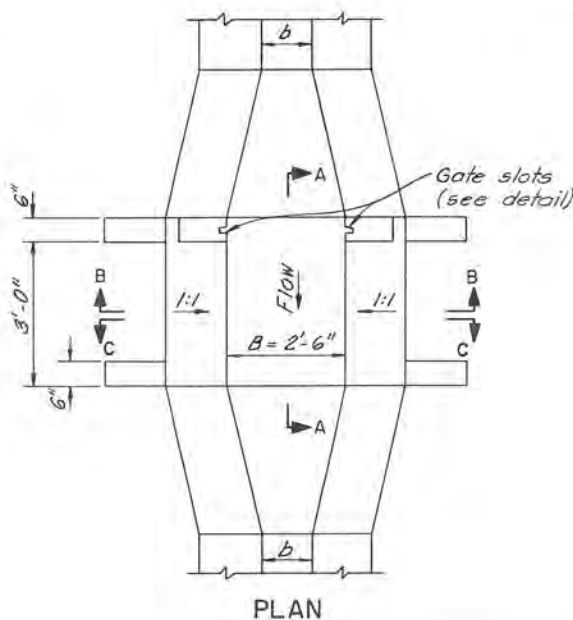
THREE WAY WOOD DIVISION BOX  
B = 2'-6", 3'-0", 3'-6" d = 12"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

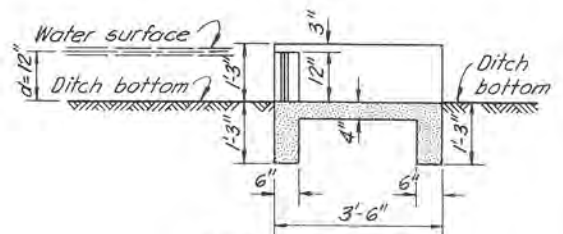
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.14-2



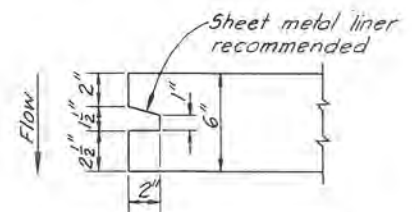
ISOMETRIC VIEW



PLAN

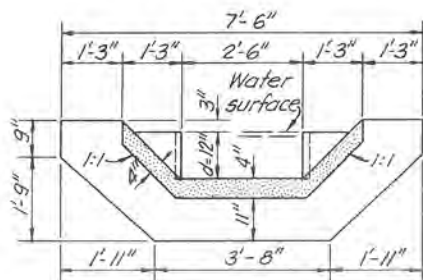


SECTION A-A

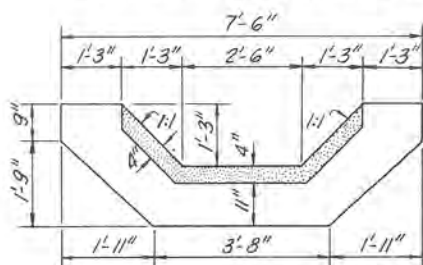


GATE SLOT DETAIL

Concrete quantity = 0.60 cu. yd.



SECTIONAL ELEVATION B-B

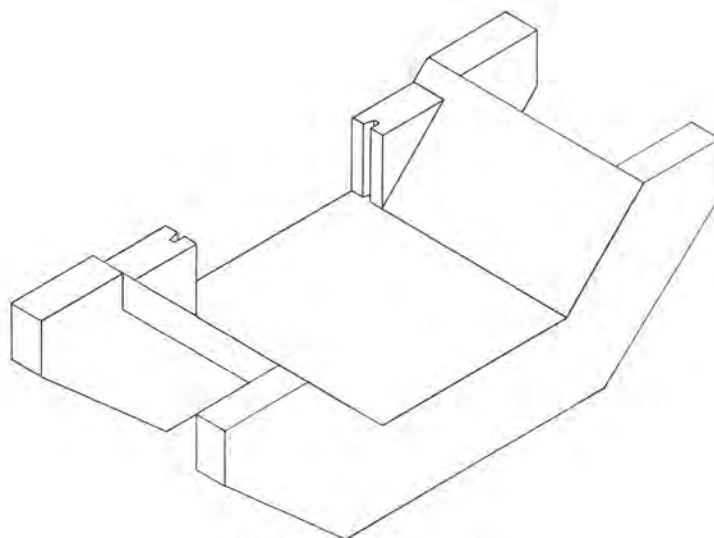


SECTIONAL ELEVATION C-C

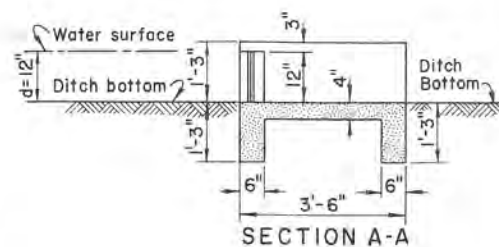
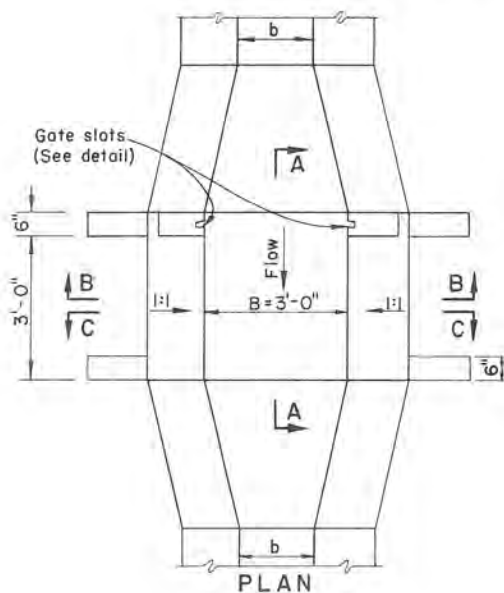
NOMENCLATURE

B = Bottom width of structure  
b = Bottom width of ditch  
d = Depth of water in ditch

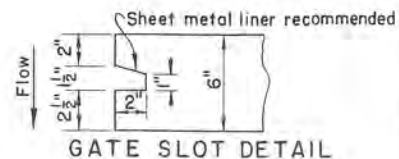
CONCRETE CHECK			
d = 12"		B = 2'-6"	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	50-19,000.15-1



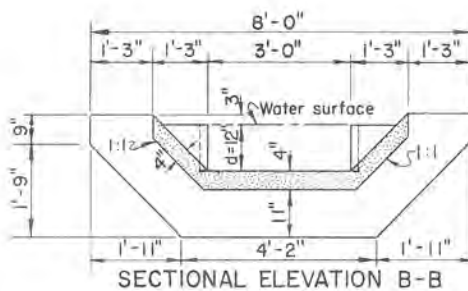
ISOMETRIC VIEW



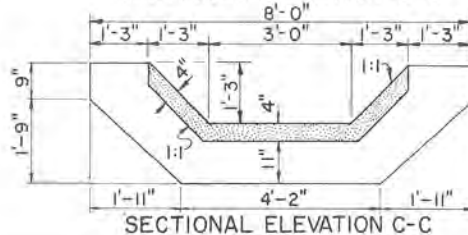
SECTION A-A



GATE SLOT DETAIL



SECTIONAL ELEVATION B-B



SECTIONAL ELEVATION C-C

Concrete quantity = 0.64 cu. yd.

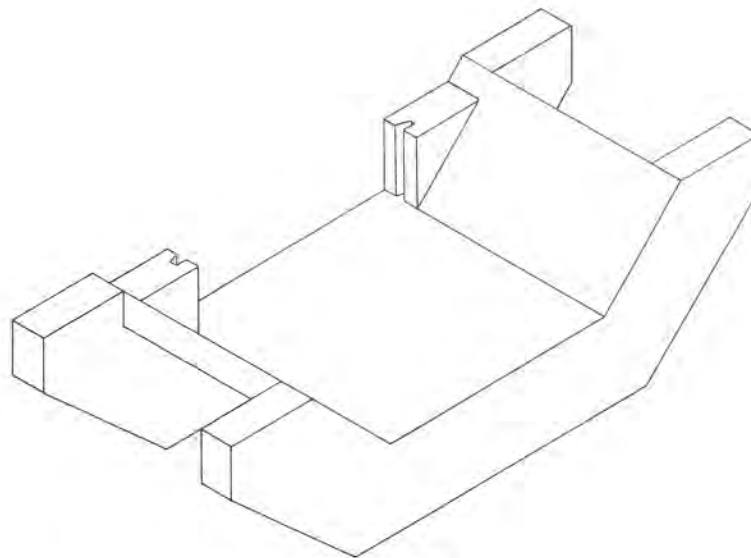
#### NOMENCLATURE

B = Bottom width of structure

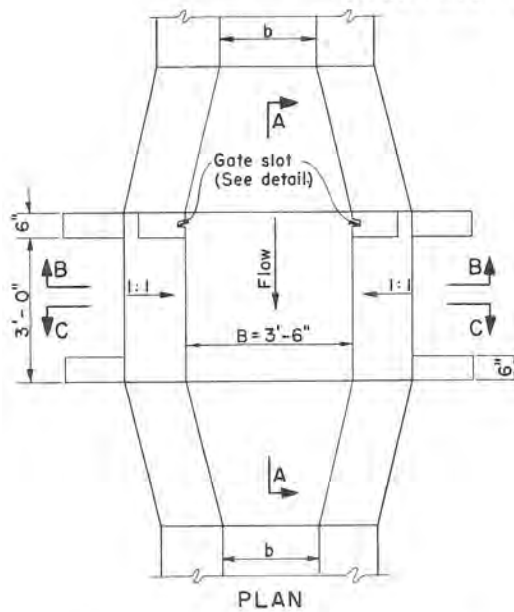
b = Bottom width of ditch

d = Depth of water in ditch

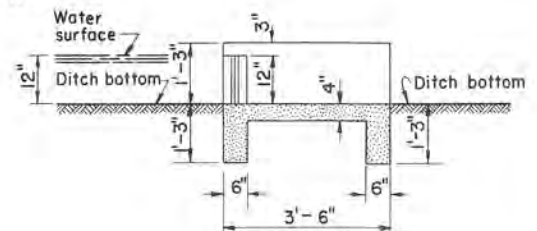
CONCRETE CHECK			
d = 12"		B = 3'-0"	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.15-2



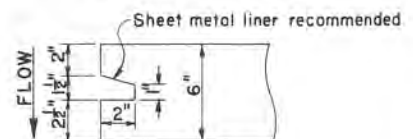
ISOMETRIC VIEW



PLAN

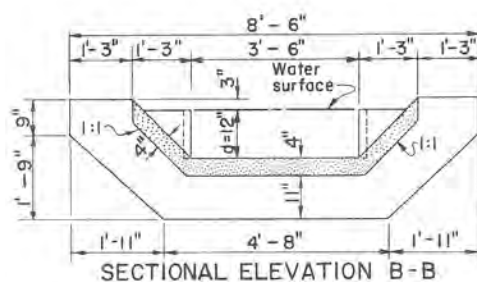


SECTION A-A

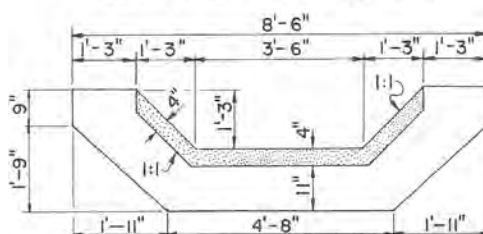


GATE SLOT DETAIL

Concrete quantity = 0.67 cu. yd.



SECTIONAL ELEVATION B-B

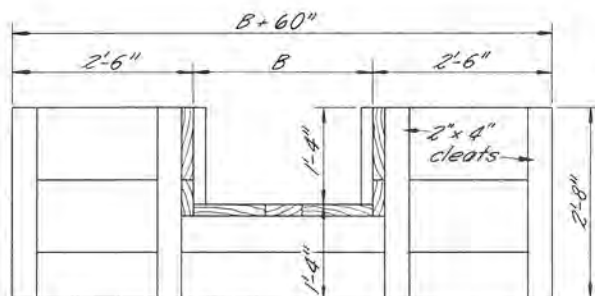


SECTIONAL ELEVATION C-C

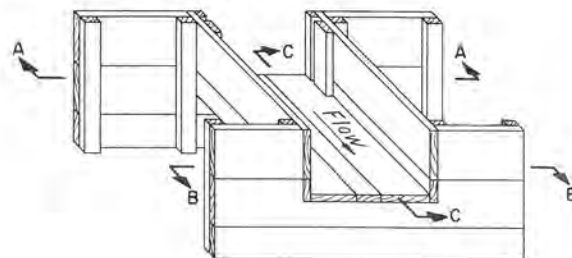
# NOMENCLATURE

B = Bottom width of structure  
b = Bottom width of ditch  
d = Depth of water in ditch

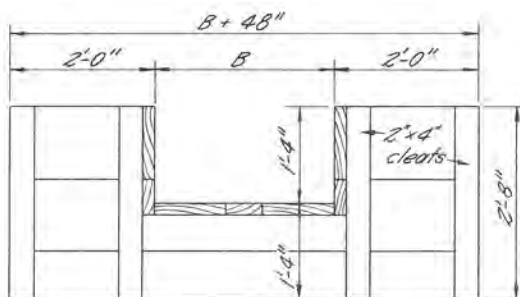
CONCRETE CHECK			
d = 12"		B = 3' - 6"	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.15-3



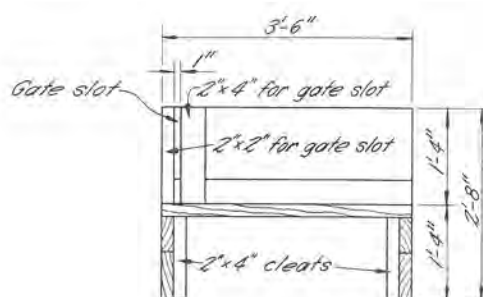
SECTIONAL ELEVATION A-A



OBLIQUE VIEW



SECTIONAL ELEVATION B-B



SECTIONAL ELEVATION C-C

**Notes:**

1. All lumber to be 2" full dimension pressure treated, secured with cement coated nails.
2. Nomenclature:  
 $B$  = width of structure.  
 $d$  = depth of water in ditch.

**TABLE OF QUANTITIES**

$B$	B.F.M.
2'-6"	105
3'-0"	110
3'-6"	116

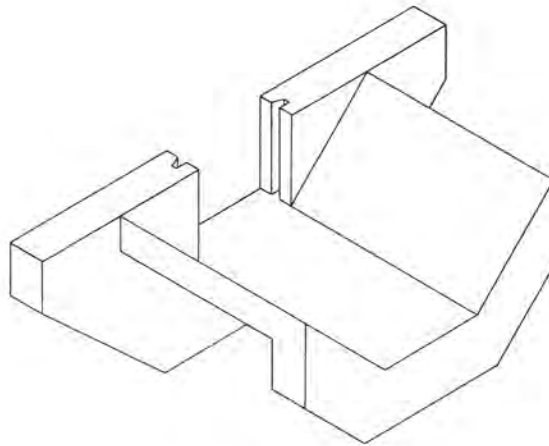
**WOOD CHECK**

$B = 2'-6", 3'-0", 3'-6" \quad d = 12"$

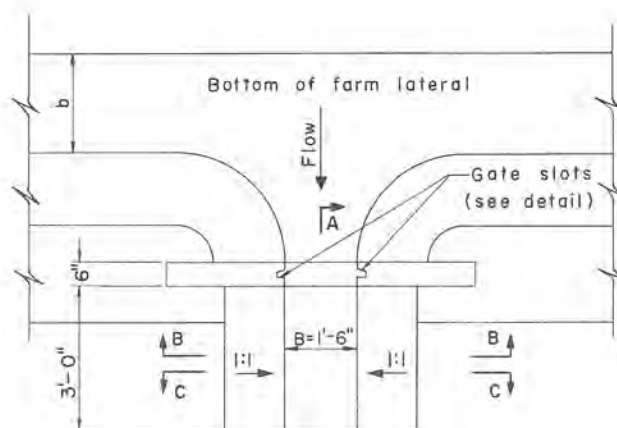
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000,16-1

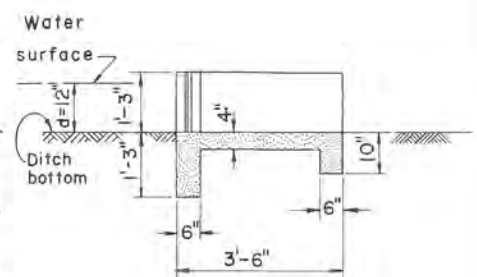




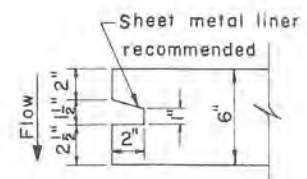
ISOMETRIC VIEW



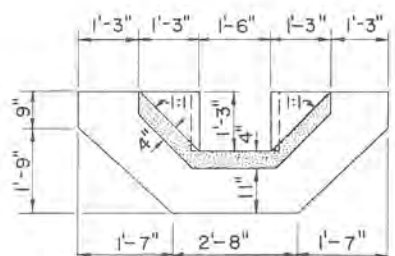
PLAN



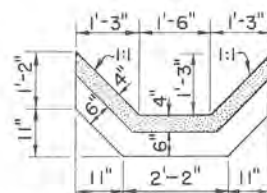
SECTION A-A



DETAIL OF GATE SLOT



SECTIONAL ELEVATION B-B



SECTIONAL ELEVATION C-C

Concrete quantity = 0.44 cu. yd.

#### NOMENCLATURE

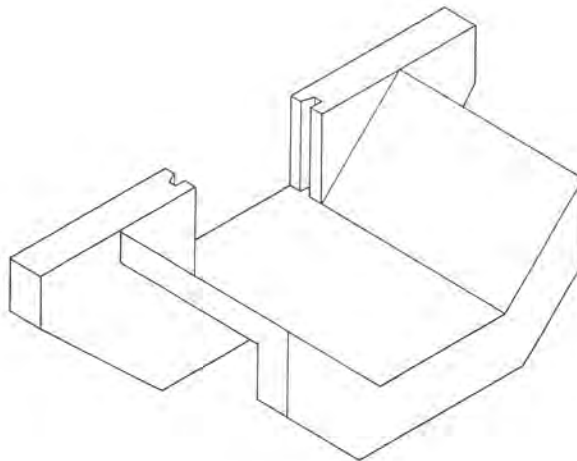
B = Bottom width of structure  
b = Bottom width of ditch  
d = Depth of water in ditch

#### CONCRETE TURNOUT

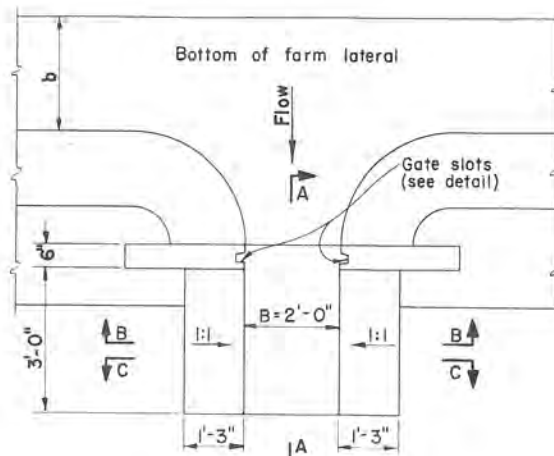
d = 12" B = 1'-6"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

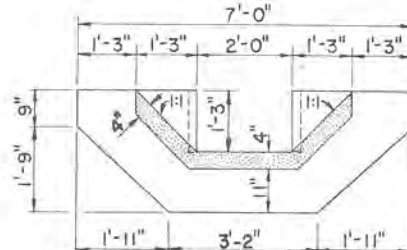
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	50-19,000.17-1



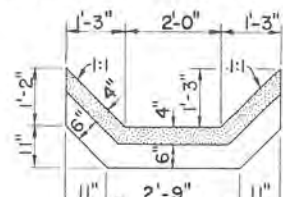
ISOMETRIC VIEW



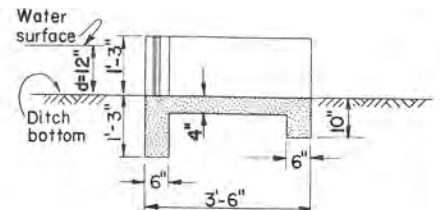
PLAN



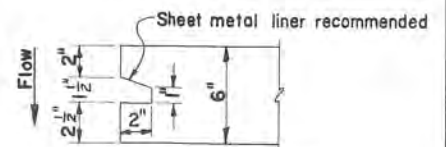
SECTIONAL ELEVATION B-B



SECTIONAL ELEVATION C-C



SECTION A-A



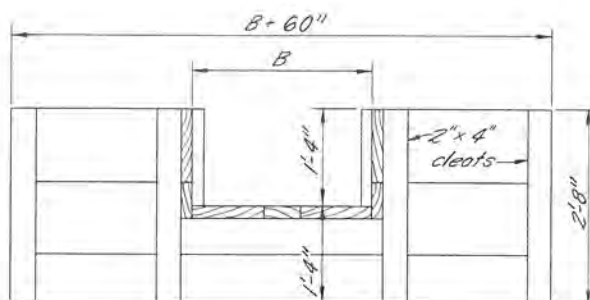
DETAIL OF GATE SLOT

Concrete quantity = 0.47 cu. yd.

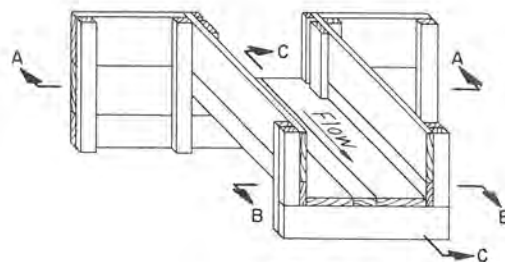
#### NOMENCLATURE

B = Bottom width of structure  
b = Bottom width of ditch  
d = Depth of water in ditch

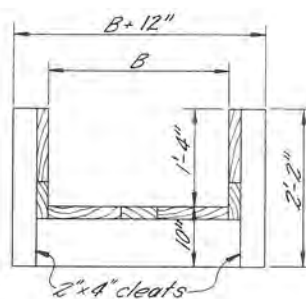
CONCRETE TURNOUT			
d = 12"		B = 2'-0"	
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.17-2



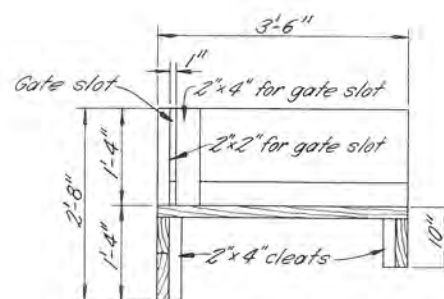
SECTIONAL ELEVATION A-A



OBLIQUE VIEW



SECTIONAL ELEVATION B-B



SECTIONAL ELEVATION C-C

*Notes:*

1. All lumber to be 2" full dimension pressure treated, secured with cement coated nails.
2. Nomenclature:  
 $B$  = Width of structure.  
 $d$  = Depth of water in ditch.

TABLE OF QUANTITIES

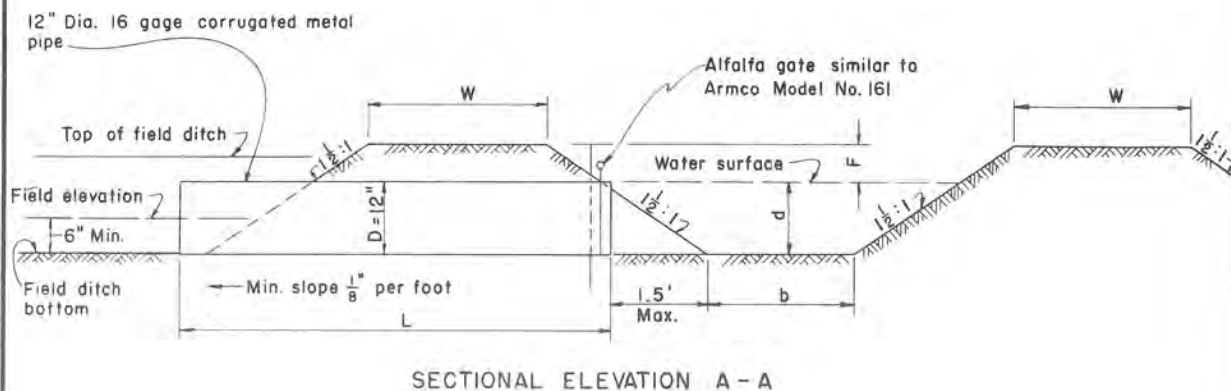
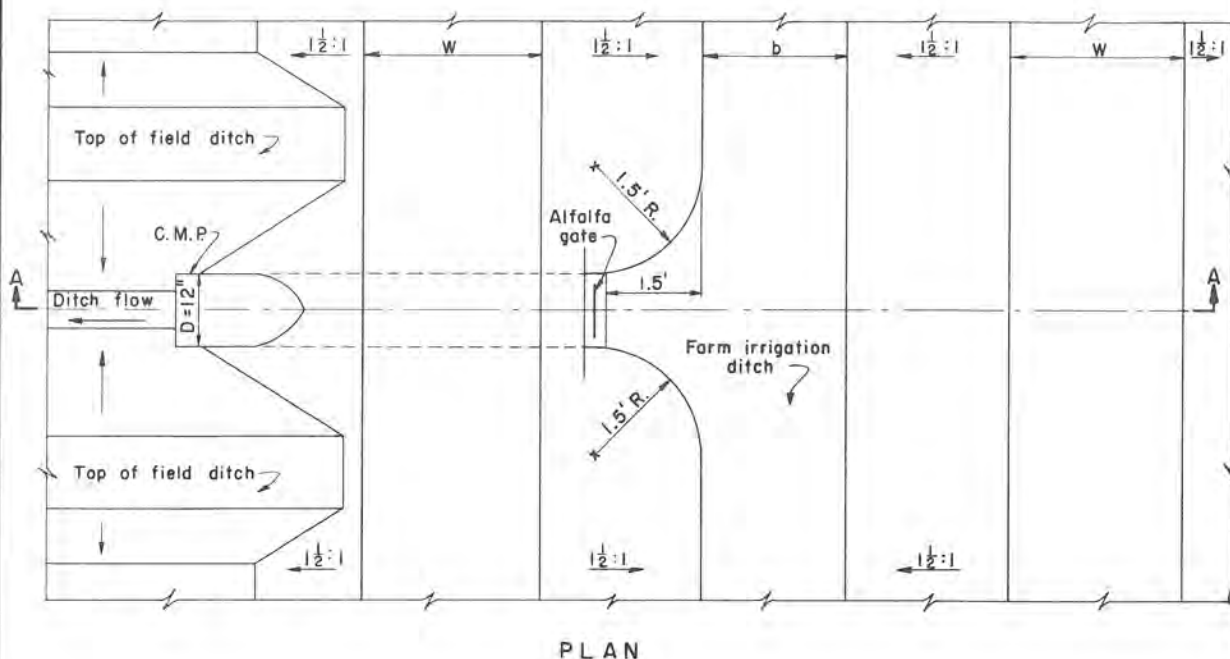
$B$	B.F.M.
2'-6"	34
3'-0"	37
3'-6"	40

WOOD TURNOUT

$B = 2'-6", 3'-0", 3'-6" \quad d = 12"$

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.18-1



Note: Top of pipe inlet not to be above the water surface.

b	d	F	W	L
feet	feet	feet	feet	feet
1.0	1.0	0.5	1.50	6.0
1.5	1.0	0.5	2.00	6.0
2.0	1.0	0.5	2.50	6.0
1.0	1.2	0.7	1.25	6.0
1.5	1.2	0.7	1.50	6.0
2.0	1.2	0.7	2.00	8.0
1.5	1.33	0.77	1.75	8.0
2.0	1.33	0.77	2.00	8.0

Pipe capacity with water surface at inlet same elevation as top of pipe and outlet unsubmerged.

Pipe diameter "D" in inches	Turnout Capacity c.f.s.
12	2.3

#### NOMENCLATURE

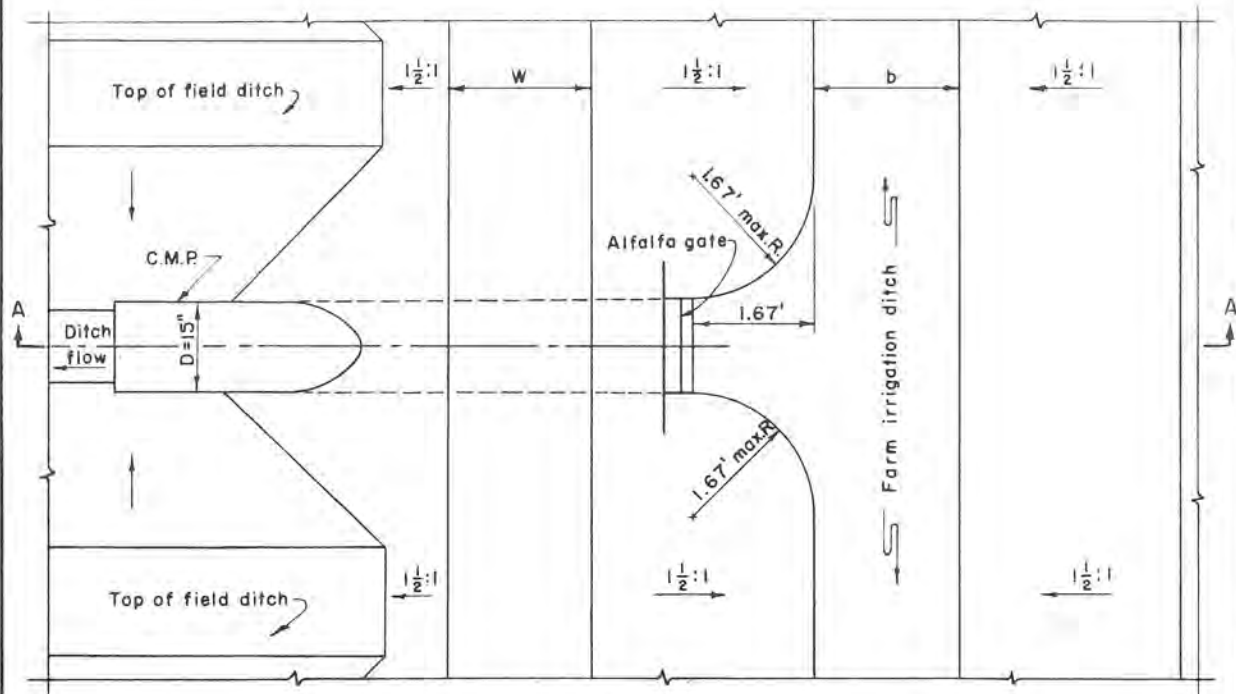
b = Bottom width of farm irrigation ditch  
d = Depth of water in farm irrigation ditch  
W = Top width  
F = Free board  
L = Length of pipe  
D = Diameter of pipe

12" Diameter Alfalfa Gate

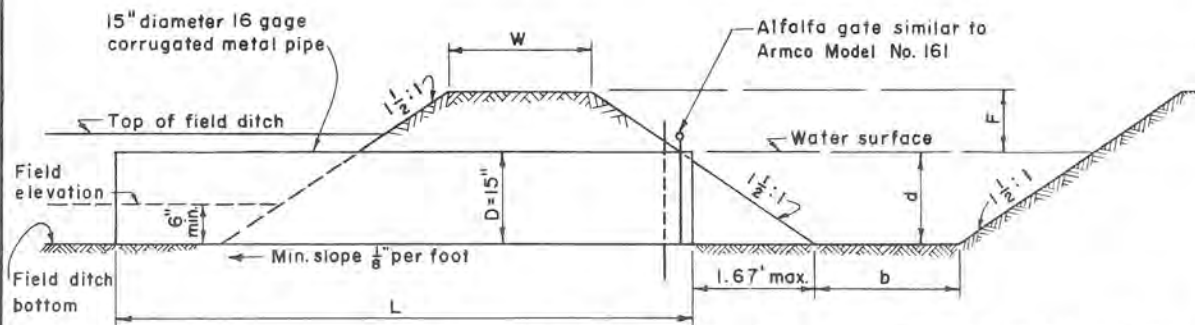
#### CORRUGATED METAL PIPE TURNOUT

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.19-1



PLAN



SECTIONAL ELEVATION A-A

Note: Top of pipe inlet not to be above the water surface

b	d	F	W	L
feet	feet	feet	feet	feet
1.0	1.0	0.5	1.50	6.0
1.5	1.0	0.5	2.00	6.0
2.0	1.0	0.5	2.50	6.0
1.0	1.2	0.7	1.25	6.0
1.5	1.2	0.7	1.50	6.0
2.0	1.2	0.7	2.00	8.0
1.5	1.33	0.77	1.75	8.0
2.0	1.33	0.77	2.00	8.0

NOMENCLATURE

b=Bottom width of farm irrigation ditch  
d=Depth of water in farm irrigation ditch  
W=Top width  
F=Freeboard  
L=Length of pipe  
D=Diameter of pipe

Pipe capacity with water surface at inlet same elevation as top of pipe and outlet unsubmerged

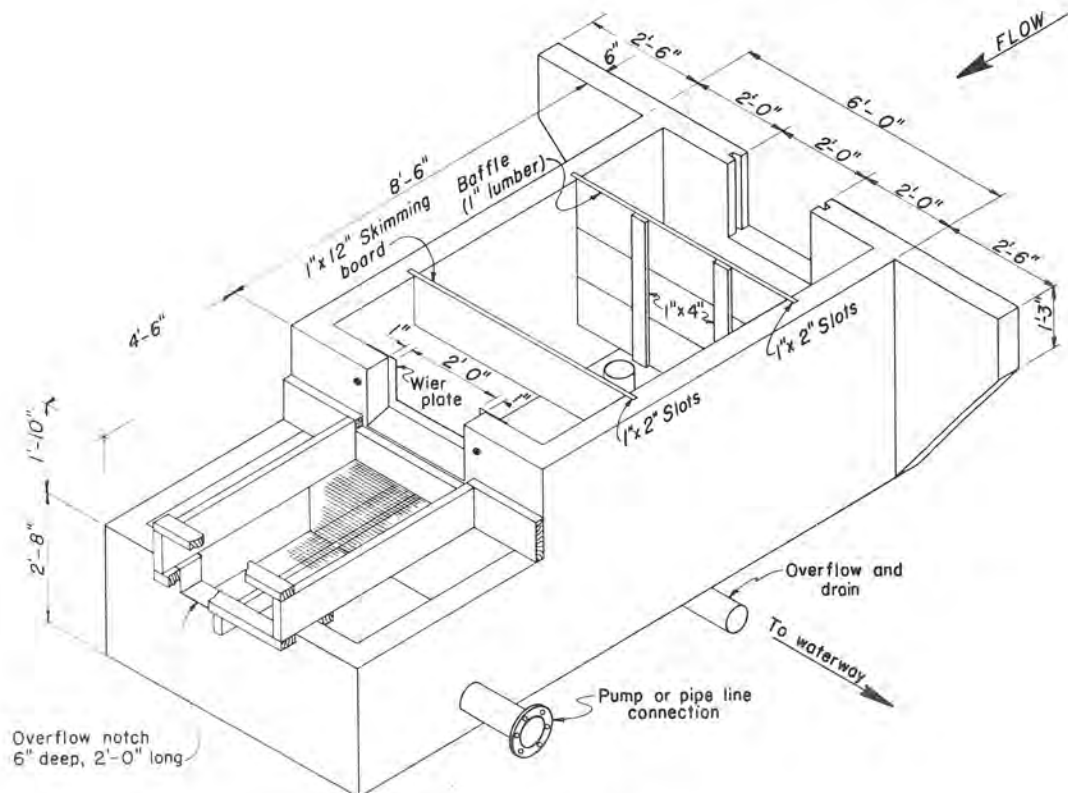
Pipe diameter "D" in inches	Turnout capacity c.f.s.
15	4.0

15" Diameter Alfalfa Gate

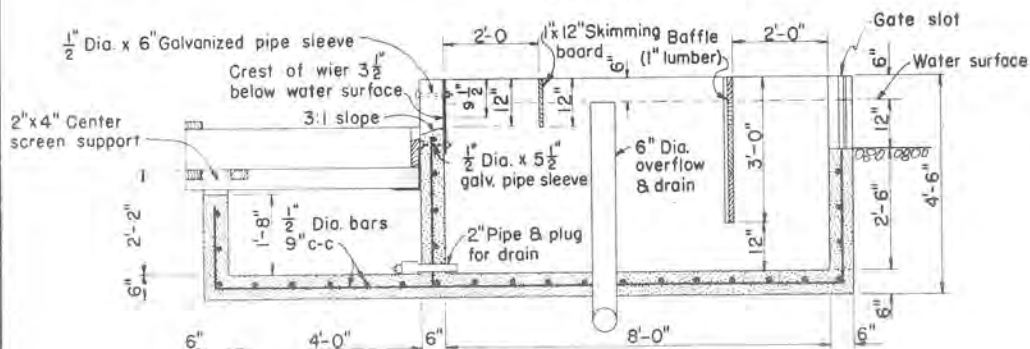
CORRUGATED METAL PIPE TURNOUT

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

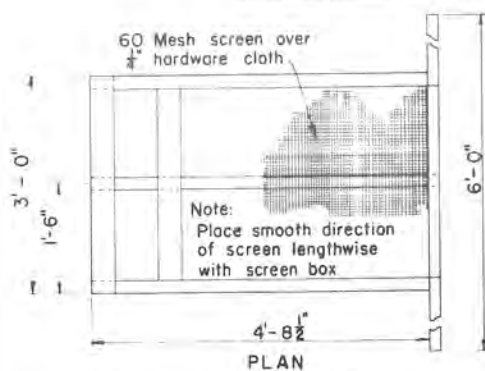
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000,19-2



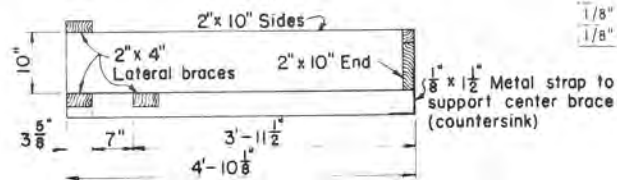
ISOMETRIC



CENTERLINE CROSS SECTION



PLAN



SIDE VIEW  
DETAIL OF TRASH SCREEN

TABLE OF QUANTITIES

ITEM	UNIT	QUANTITY
CONCRETE	CU. YDS.	4.3
REINFORCING STEEL	LIN. FT.	668
60 MESH COPPER SCREEN	SQ. FT.	14
1/4" HARDWARE CLOTH	SQ. FT.	14
LUMBER	BD. FT.	57
1/2" DIA. GALVANIZED PIPE SLEEVE 6" LONG	EACH	2
1/2" DIA. GALVANIZED PIPE SLEEVE 5 1/2" LONG	EACH	3
3/8" DIA. GALVANIZED BOLTS, 5 1/2" LONG	EACH	2
3/8" DIA. GALVANIZED BOLTS, 6" LONG	EACH	3
2" DIA. PIPE 8" LONG	EACH	1
2" PIPE COUPLING	EACH	1
2" PIPE PLUG	EACH	1
6" DIA. PIPE, 3'-6" LONG	EACH	2
6" PIPE ELBOW	EACH	1
1/8" WIER PLATE	EACH	1
1/8" X 1/2" X 12" METAL STRAP	EACH	1

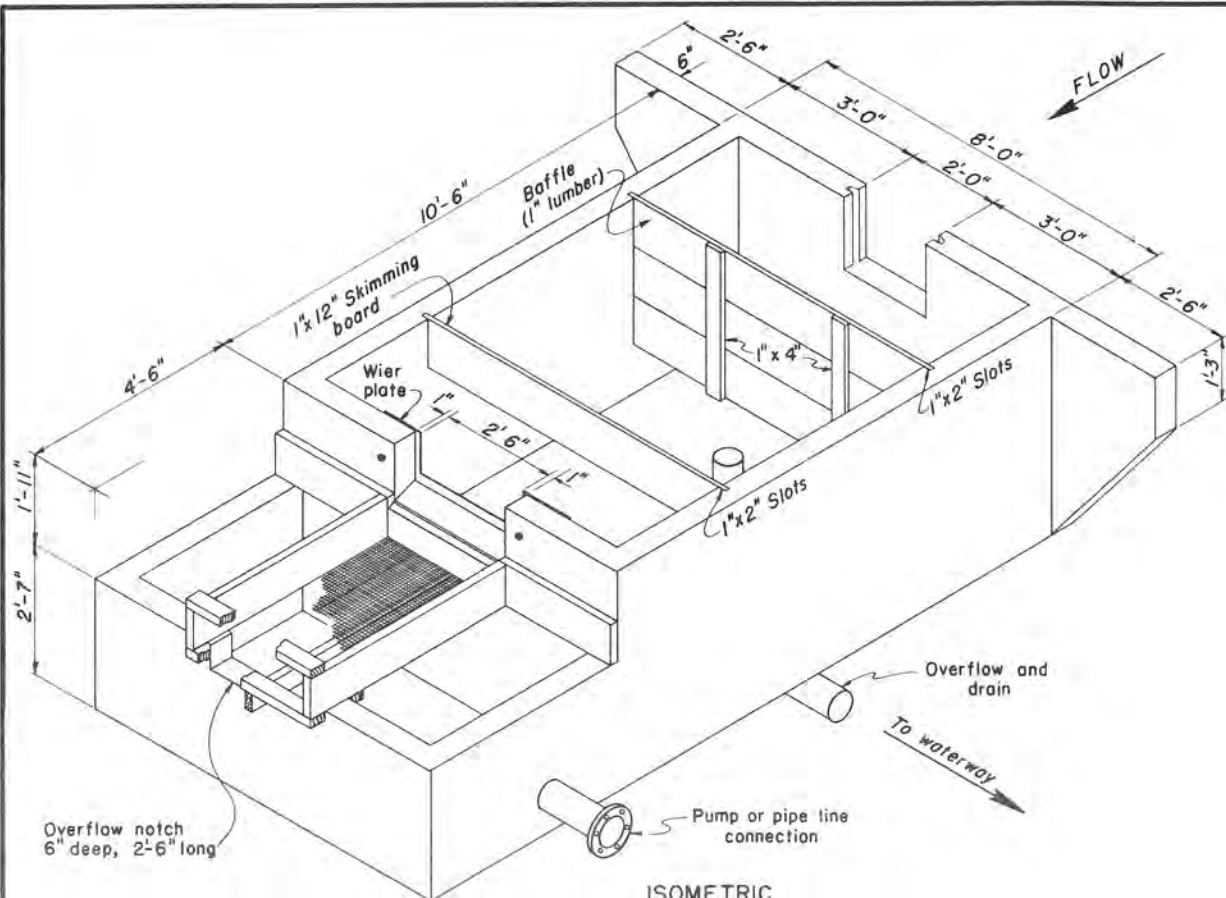
Capacity up to 450 G.P.M.

# IRRIGATION WATER DESILTING BOX AND TRASH SCREEN

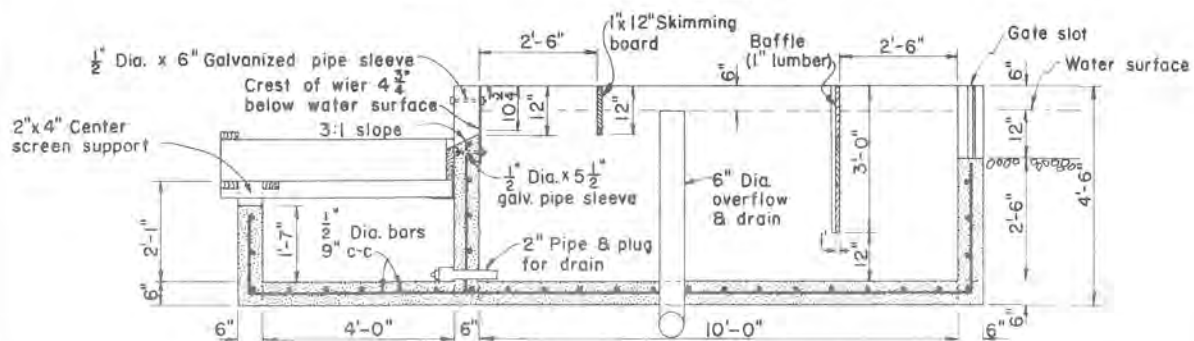
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.20-1

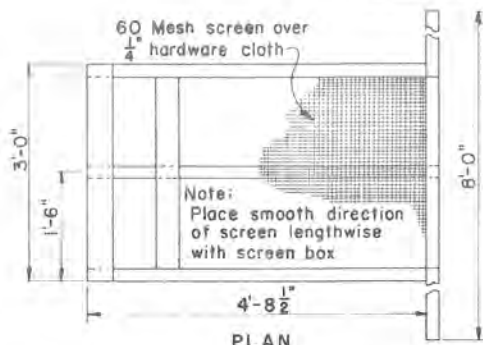




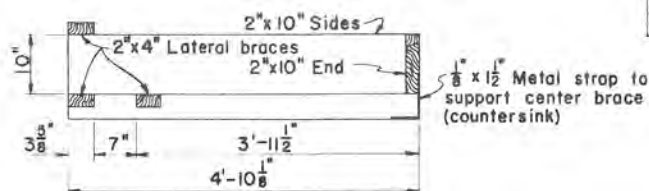
ISOMETRIC



CENTERLINE CROSS SECTION



PLAN



SIDE VIEW

DETAIL OF TRASH SCREEN

TABLE OF QUANTITIES

ITEM	UNIT	QUANTITY
CONCRETE	CU. YDS.	5.7
REINFORCING STEEL	LIN. FT.	883
60 MESH COPPER SCREEN	SQ. FT.	14
1/4" HARDWARE CLOTH	SQ. FT.	14
LUMBER	BD. FT.	71
1/2" GALVANIZED PIPE SLEEVES, 6" LONG	EACH	2
1/2" GALVANIZED PIPE SLEEVES, 5 1/2" LONG	EACH	3
3/8" DIA. GALVANIZED BOLTS, 6 1/2" LONG	EACH	2
3/8" DIA. GALVANIZED BOLTS, 6" LONG	EACH	3
2" DIA. PIPE, 8" LONG	EACH	1
2" PIPE COUPLING	EACH	1
2" PIPE PLUG	EACH	1
6" DIA. PIPE, 3'-6" LONG	EACH	2
6" PIPE ELBOW	EACH	1
1/8" WEIR PLATE	EACH	1
1/8" x 1/2" x 12" METAL STRAP	EACH	1

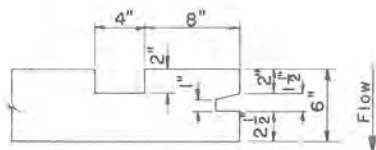
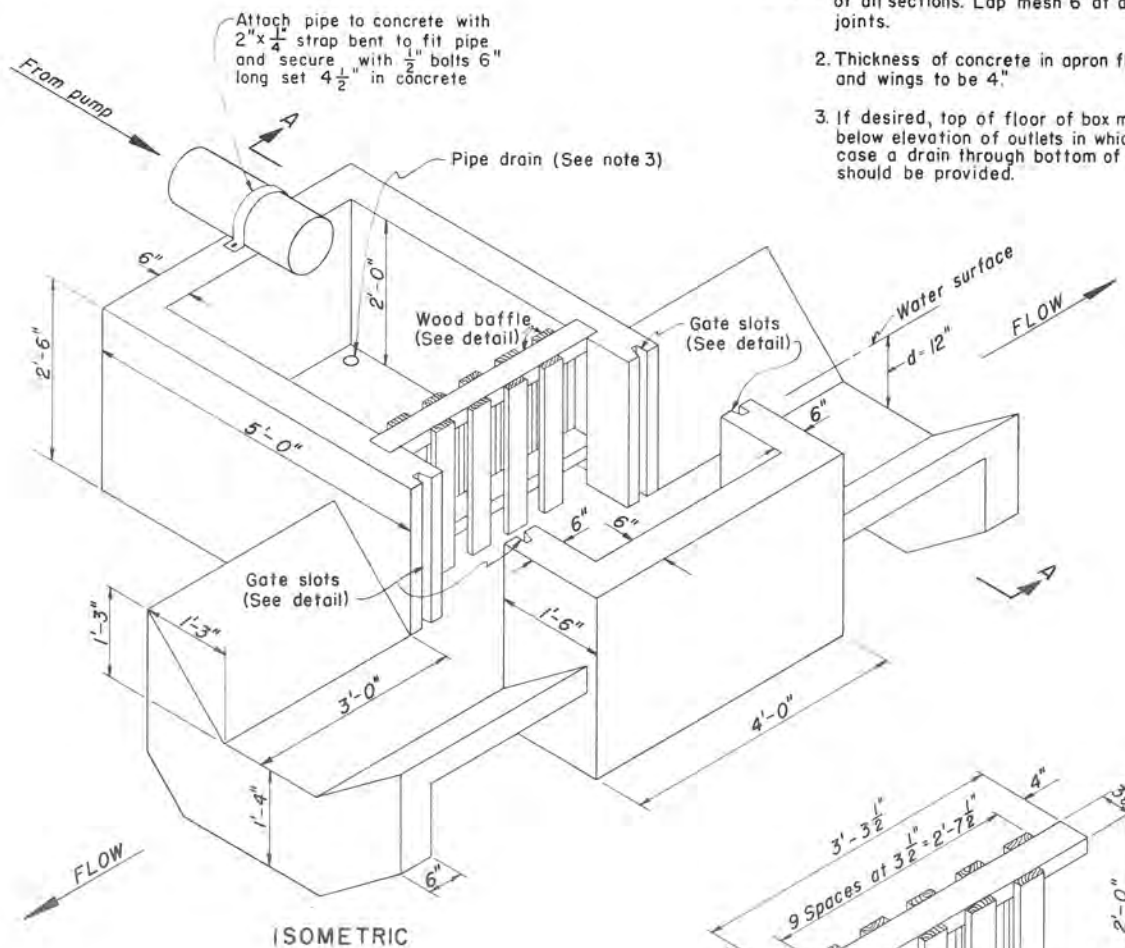
Capacity up to 900 G.P.M.

IRRIGATION WATER DESILTING BOX  
AND TRASH SCREEN

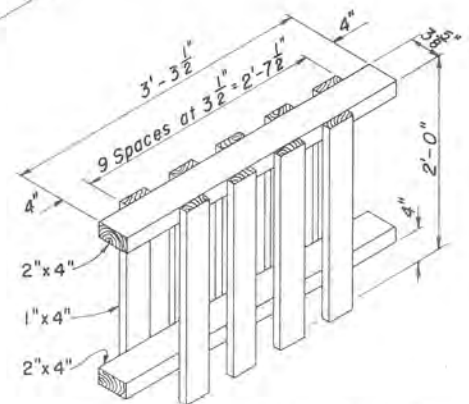
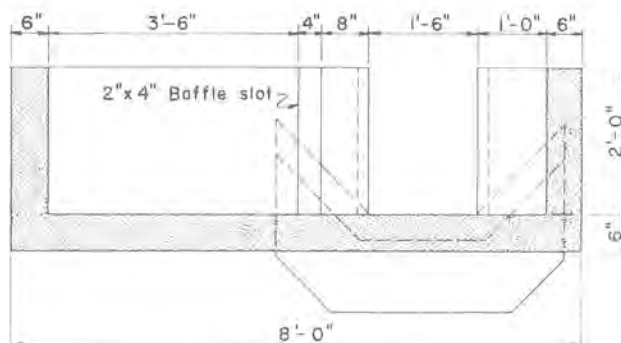
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000 20-2





DETAIL OF GATE SLOT  
AND BAFFLE SLOT



DETAIL OF WOOD BAFFLE

TABLE OF QUANTITIES

LUMBER L. FT.	WIRE MESH	CONCRETE
1" x 4"	2" x 4"	Sq. Ft. Cu. Yds.
18.0'	6.6'	124 1.9
	* Without aprons	79 1.3

\* In cohesive soil, when outlets are on opposite sides, aprons may be omitted

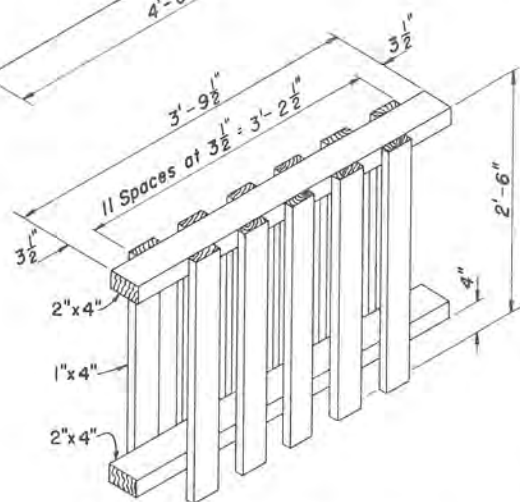
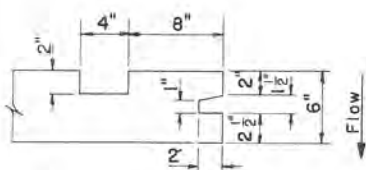
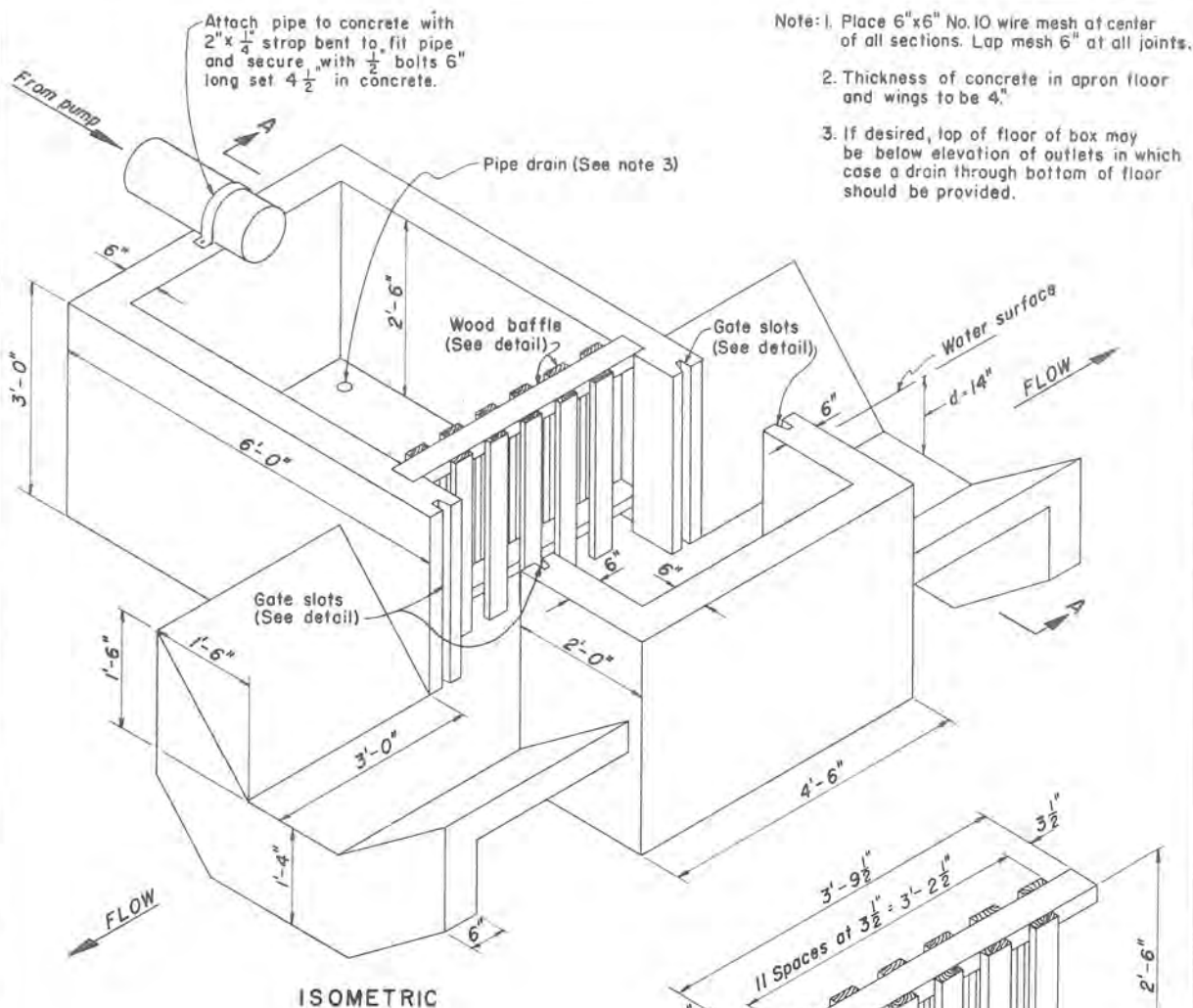
d = Depth of flow in ditch  
f = Freeboard from water surface to top of ditch bank

d = 12"  
Capacity 600-1000 G.P.M.

COMBINATION PUMP OUTLET  
AND DIVISION BOX

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	DRAWN	DATE	DRAWING NO.
		1-64	5,0-19,000,22-1



DETAIL OF GATE SLOT AND BAFFLE SLOT

DETAIL OF WOOD BAFFLE

TABLE OF QUANTITIES

LUMBER L. FT.		WIRE MESH CONCRETE	
		Sq. Ft.	Cu. Yds.
1" x 4"	2" x 4"	163	2.5
27.5'	7.6'	* Without aprons	
		117	1.9

\* In cohesive soil, when outlets are on opposite sides, aprons may be omitted.

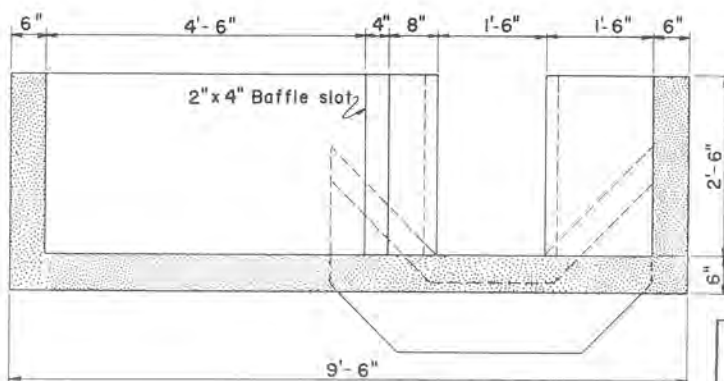
d = Depth of flow in ditch  
f = Freeboard from water surface to top of ditch bank

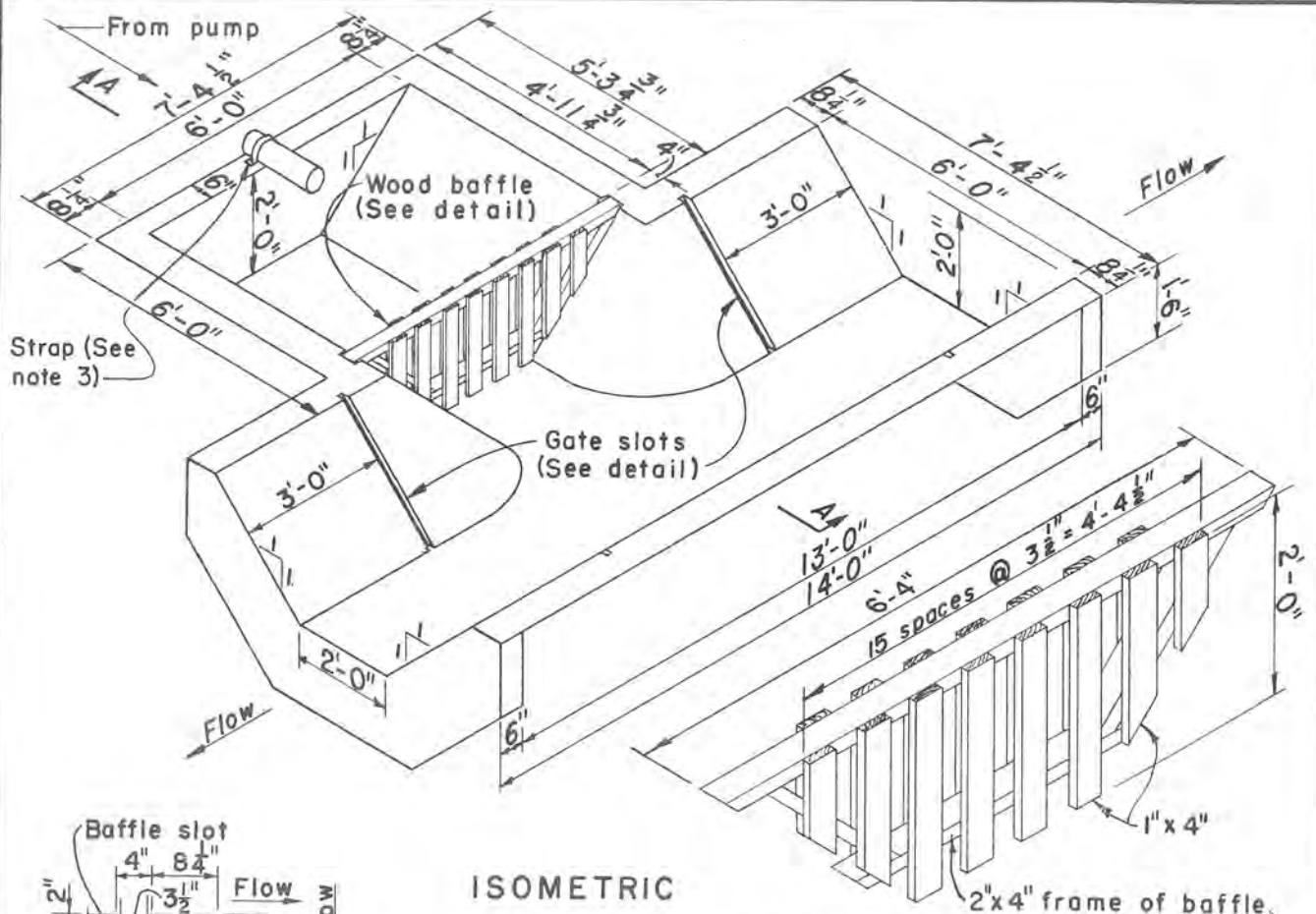
d = 14"  
Capacity 1050-1600 G. P. M.

COMBINATION PUMP OUTLET AND DIVISION BOX

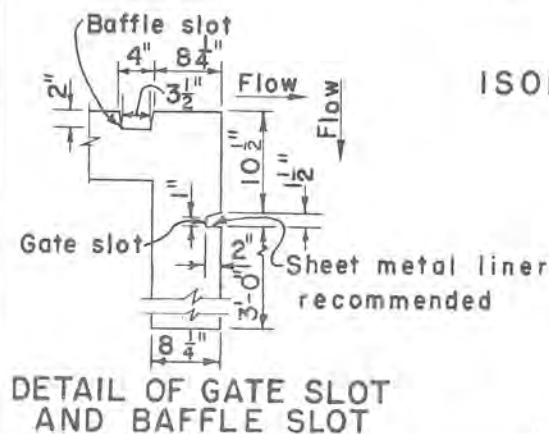
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.22-2

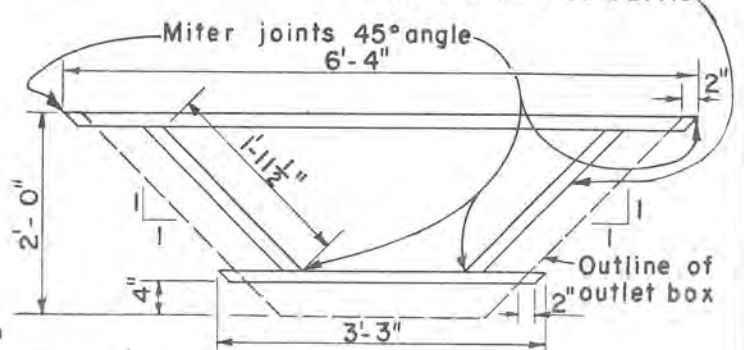




ISOMETRIC



DETAIL OF GATE SLOT AND BAFFLE SLOT



DETAIL OF WOOD BAFFLE

- Notes: 1. Place 6" x 6" No. 10 wire mesh at center of all sections. Lap mesh 6" at all joints.  
 2. All walls and floor 6" thickness.  
 3. Attach pipe to concrete with 2" x 4" strap bent to fit pipe and secure with 1/2" x 6" bolts set 4 1/2" in concrete  
 $d = 20"$

SECTION A-A

TABLE OF QUANTITIES

LUMBER	WIRE MESH	CONCRETE
LIN. FT.	SQ. FT	CU. YDS.
1" x 4"	220	3.5
32.0	11.6	

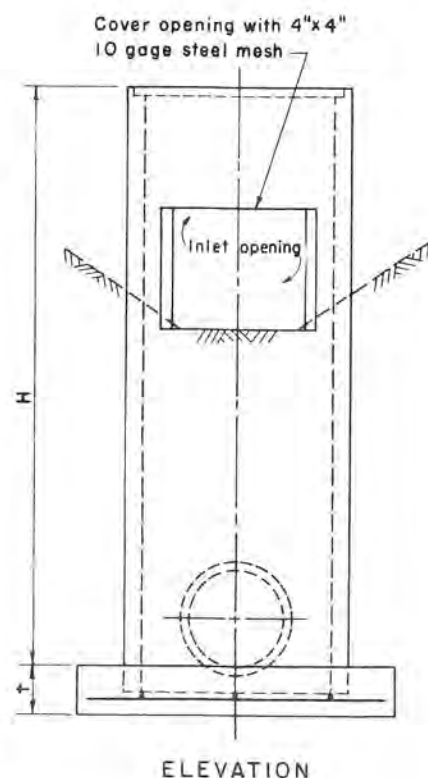
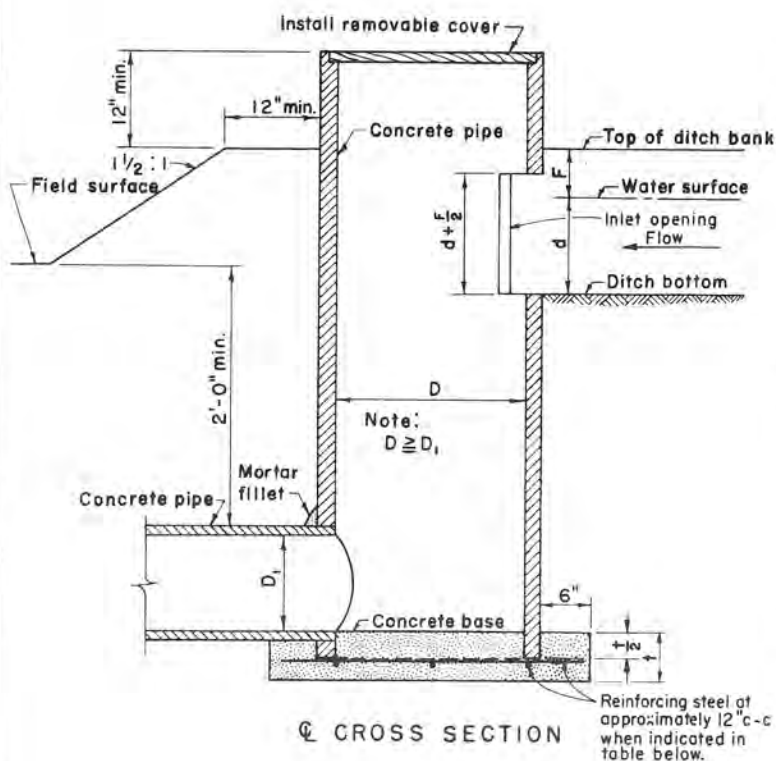
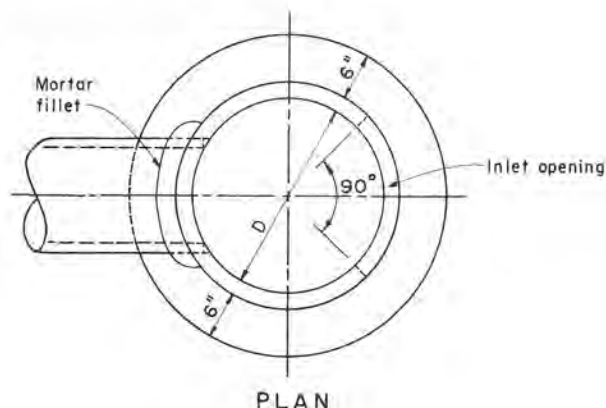
Capacity 1050 to 1550 G.P.M.

COMBINATION PUMP OUTLET  
AND DIVISION BOX

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	50-19,000.22-3





### NOMENCLATURE

d = Depth of water in ditch  
 F = Freeboard in ditch  
 D = Diameter of vertical pipe  
 D<sub>1</sub> = Diameter of underground pipe  
 t = Thickness of concrete base  
 H = Height of vertical pipe above top of concrete base  
 Q = Discharge through structure in c.f.s. and g.p.m.

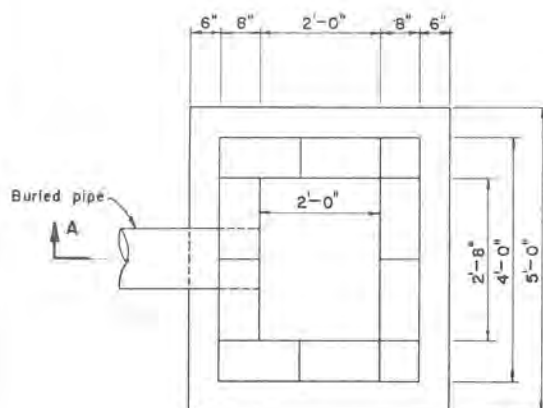
Max. Q			D		A.S.T.M. Spec.	Concrete Base					
c. f. s.	g. p. m.	Inches	No.	Type		H=10' or less	H=more than 10'	Reinforcing steel			
						t	Cu. yd.	t	Cu. yd.	Size	Length
0.79	355	12	C-118	Concrete Irrigation Pipe		4"	0.05	6"	0.07	—	—
1.07	480	14				4"	0.05	6"	0.08	—	—
1.23	550	15				4"	0.06	6"	0.09	—	—
1.40	630	16				4"	0.06	6"	0.10	—	—
1.77	795	18				4"	0.07	6"	0.11	—	—
2.18	980	20				6"	0.13	8"	0.17	—	—
2.41	1080	21	C-76	Class II Reinforced Concrete Pipe		6"	0.14	8"	0.18	—	—
3.14	1410	24				6"	0.16	8"	0.22	—	—
3.98	1785	27				6"	0.20	8"	0.26	3/8"	19'
4.91	2205	30				6"	0.23	8"	0.30	3/8"	21'
5.94	2665	33				8"	0.35	8"	0.35	3/8"	22'
7.07	3175	36				8"	0.39	8"	0.39	3/8"	23'
9.62	4320	42				8"	0.50	8"	0.50	3/8"	38'
12.57	5640	48				8"	0.62	8"	0.62	1/2"	46'

### GRAVITY INLET FOR CONCRETE PIPE

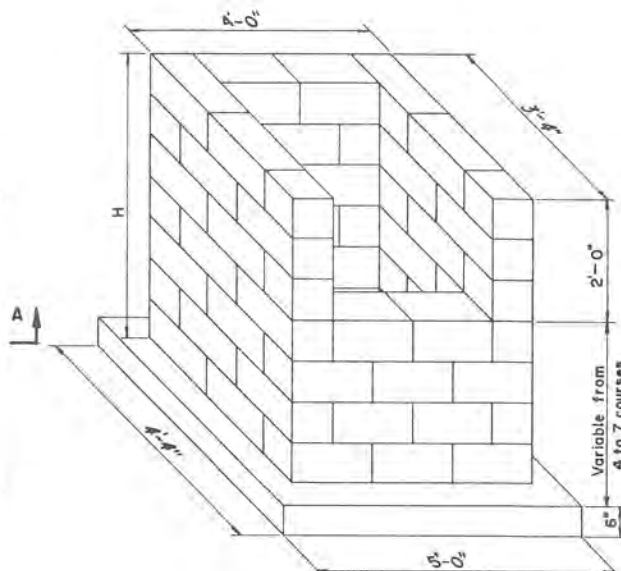
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	REVISION NO.
		1-64	50-19,000.23-1

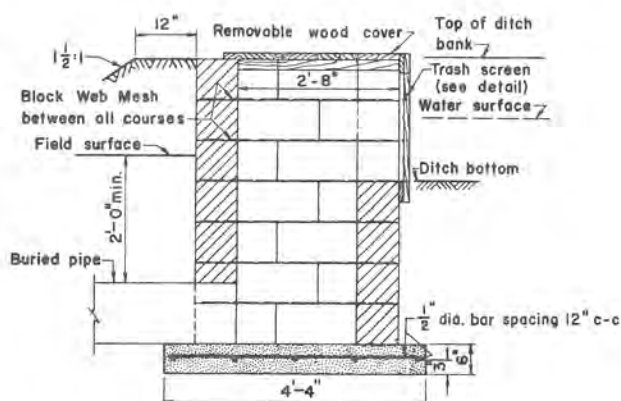




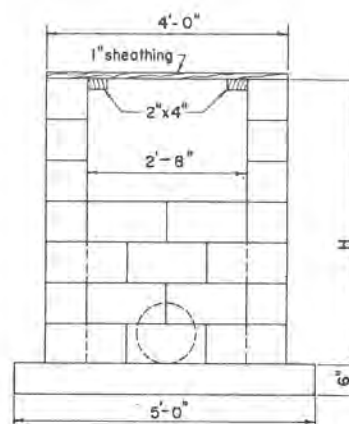
PLAN



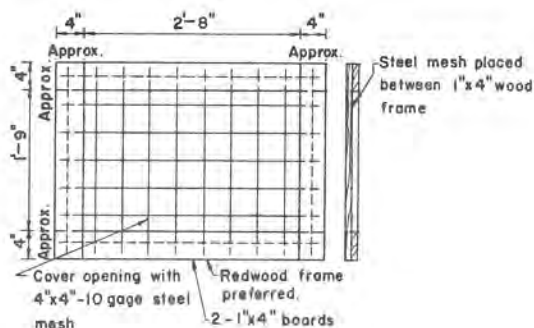
OBLIQUE VIEW



SECTIONAL ELEVATION A-A



ELEVATION



DETAIL OF TRASH SCREEN

NOTES: CONCRETE BLOCK WALLS TO BE REINFORCED BY PLACING HIGH TENSION STEEL WIRE MESH, NO. 9 WIRE, SIMILAR TO CARTER-WATERS BLOCK-MESH IN HORIZONTAL BLOCK JOINTS AS SHOWN IN SECTIONAL ELEVATION A-A.

THE JOINT THICKNESS BETWEEN CONCRETE BLOCKS SHALL BE ABOUT 1/4 IN. THE CONCRETE BLOCKS SHALL BE LAID WITH STAGGERED VERTICAL JOINTS AS SHOWN ON THE PLANS. THE OPENINGS IN THE BLOCKS SHALL BE ALIGNED VERTICALLY AND FILLED WITH CONCRETE GROUT.

TABLE OF QUANTITIES

H	CONCRETE BLOCKS			CONCRETE			STEEL		WOOD	
	8"x8"x16" Stretcher blocks	8"x8"x16" Corner blocks	8"x8"x8" Corner blocks	Base	Grout	Mortar	Block mesh	4"x4"-10 ga. Wire mesh	1/2" Bars	
	number	number	number	cu. yds.	cu. yds.	cu. yds.	lin. ft.	sq. ft.	lin. ft.	
4'-8"	31	24	4	.40	.55	.08	75	8	43	2"x4"-5.33 lin. ft.
5'-4"	36	28	4	.40	.65	.09	88	8	43	1" sheathing-12 bd. ft.
6'-0"	41	32	4	.40	.70	.10	102	8	43	1"x4"-21 lin. ft.
6'-8"	46	36	4	.40	.80	.11	115	8	43	(redwood preferred)

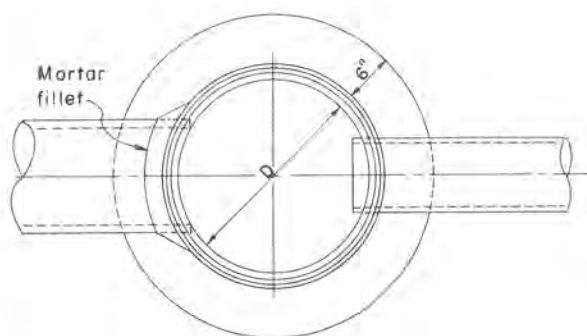
NOTES:

1. Maximum Q = 5.3 c.f.s. = 2390 g.p.m.
2. This structure may also be used as Terminal Outlet for pipe line with trash screen omitted.

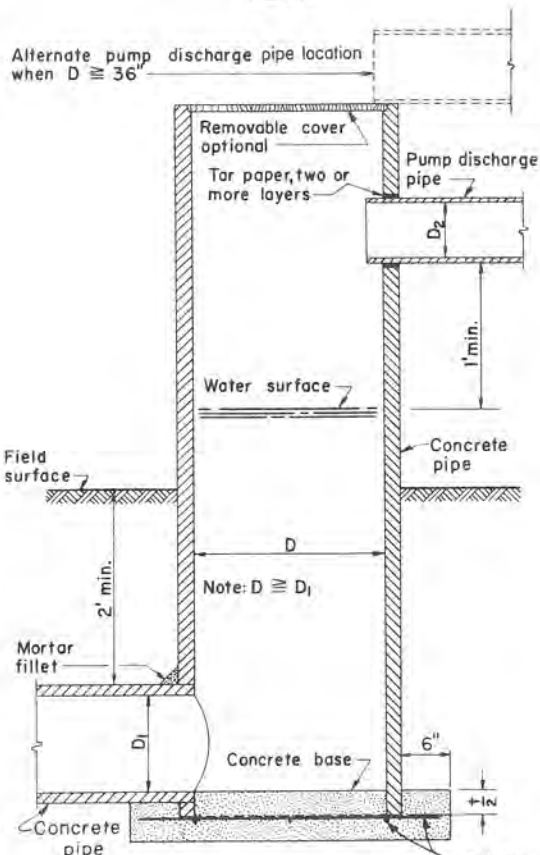
CONCRETE BLOCK GRAVITY INLET FOR BURIED PIPE LINES

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

1-64 50-19,000-24-1

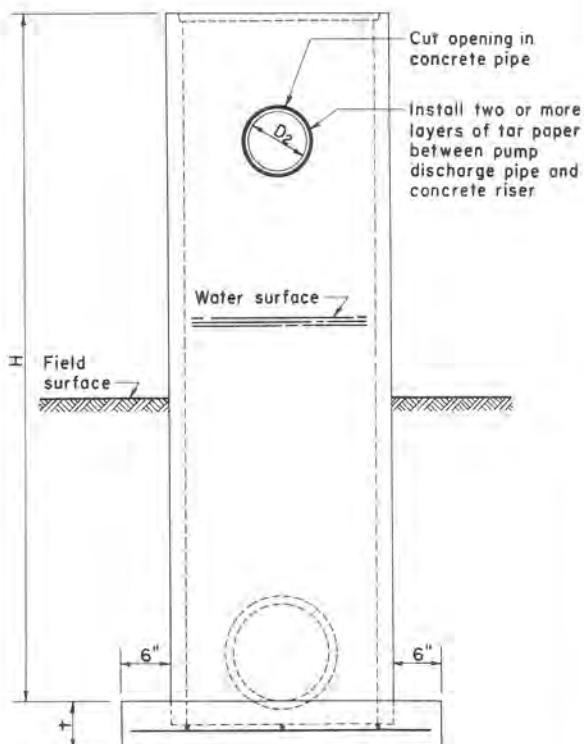


PLAN



CROSS SECTION

Reinforcing steel at approximately 12" c-c when indicated in table below



ELEVATION

Max. Q		D	A.S.T.M. Spec.		Concrete Base			
c.f.s.	g.p.m.		No.	Type	H=10' or less	H=more than 10'	Reinforcing steel	
0.79	355	12	C-118	Concrete Irrigation Pipe	4" 0.05	6" 0.07	—	—
1.07	480	14			4" 0.05	6" 0.08	—	—
1.23	550	15			4" 0.06	6" 0.09	—	—
1.40	630	16			4" 0.06	6" 0.10	—	—
1.77	795	18			4" 0.07	6" 0.11	—	—
2.18	980	20			6" 0.13	8" 0.17	—	—
2.41	1080	21			6" 0.14	8" 0.18	—	—
3.14	1410	24			6" 0.16	8" 0.22	—	—
3.98	1785	27	C-76	Class II Reinforced Concrete Pipe	6" 0.20	8" 0.26	3/8"	19'
4.91	2205	30			6" 0.23	8" 0.30	3/8"	21'
5.94	2665	33			8" 0.35	8" 0.35	3/8"	22'
7.07	3175	36			8" 0.39	8" 0.39	3/8"	23'
9.62	4320	42			8" 0.50	8" 0.50	3/8"	38'
12.57	5640	48			8" 0.62	8" 0.62	1/2"	46'

#### NOMENCLATURE

- D - Diameter of vertical pipe
- D<sub>1</sub> - Diameter of underground pipe
- D<sub>2</sub> - Diameter of pump discharge pipe
- t - Thickness of concrete base
- H - Height of vertical pipe above top of concrete base
- D - Discharge through structure in c.f.s. and g.p.m.

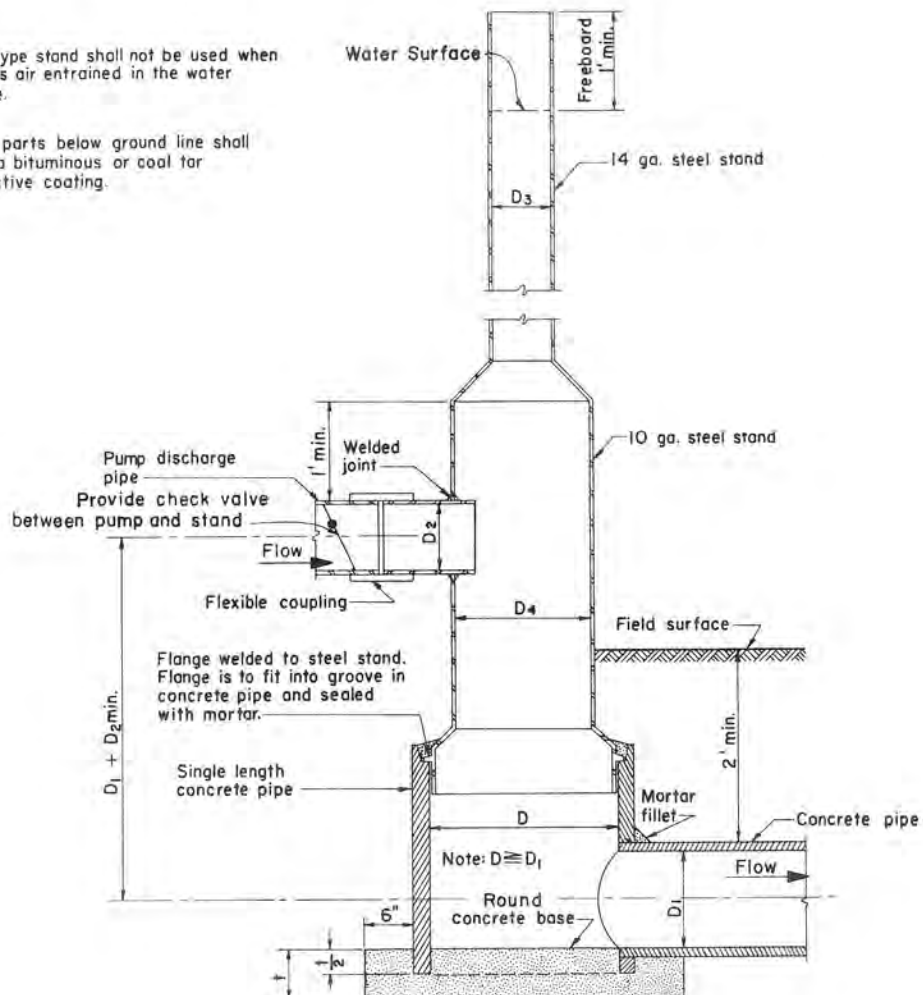
#### LOW HEAD PUMP STAND FOR CONCRETE PIPE

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	REVISION NO.
		1-64	5,0-19,000.25-1

Note: This type stand shall not be used when there is air entrained in the water source.

Metal parts below ground line shall have a bituminous or coal tar protective coating.



C CROSS SECTION

# NOMENCLATURE

D - Diameter of vertical concrete pipe

D<sub>1</sub> - Diameter of underground pipe

D<sub>2</sub> - Diameter of pump discharge pipe

D<sub>3</sub> - Diameter of upper steel stand pipe

D<sub>4</sub> - Diameter of lower steel stand pipe

t - Thickness of concrete base

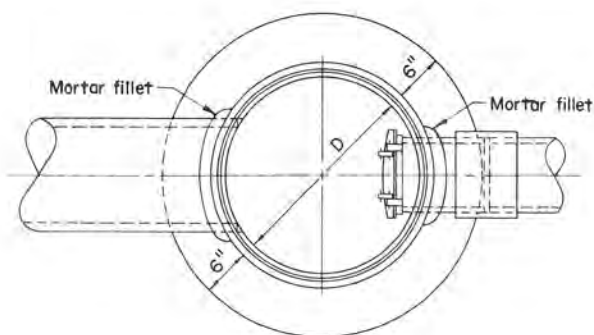
Q - Discharge through structure in c.f.s. and g.p.m.

Max. Q		Concrete Pipe			Steel Stand				Concrete Base	
		D	A.S.T.M. Spec.		D <sub>4</sub> Min.		D <sub>3</sub> Min.		t	Volume
c.f.s.	g.p.m.	Inches	No.	Type	Inches	Gage	Inches	Gage	Inches	Cu. yd.
0.79	355	12	C-118	Concrete Irrigation Pipe	8 1/2	10	3 7/8	14	4	0.05
1.07	480	14	C-118		10	10	4 1/2	14	4	0.05
1.23	550	15	C-118		10 5/8	10	4 3/4	14	4	0.06
1.40	630	16	C-118		11 3/8	10	5 1/8	14	4	0.06
1.77	795	18	C-118		12 3/4	10	5 3/4	14	4	0.07
2.18	980	20	C-118		14 1/4	10	6 3/8	14	6	0.13
2.41	1080	21	C-118	Class II Reinforced Concrete Pipe	14 7/8	10	6 3/4	14	6	0.14
3.14	1410	24	C-118		17	10	7 5/8	14	6	0.16
3.98	1785	27	C-76		19 1/8	10	8 5/8	14	6	0.20
4.91	2205	30	C-76		21 1/4	10	9 1/2	14	6	0.23
5.94	2665	33	C-76		23 3/8	10	10 1/2	14	8	0.35
7.07	3175	36	C-76		25 1/2	10	11 1/2	14	8	0.39
9.62	4320	42	C-76	Pipe	29 3/4	10	13 3/8	14	8	0.50
12.57	5640	48	C-76		34	10	15 1/4	14	8	0.62

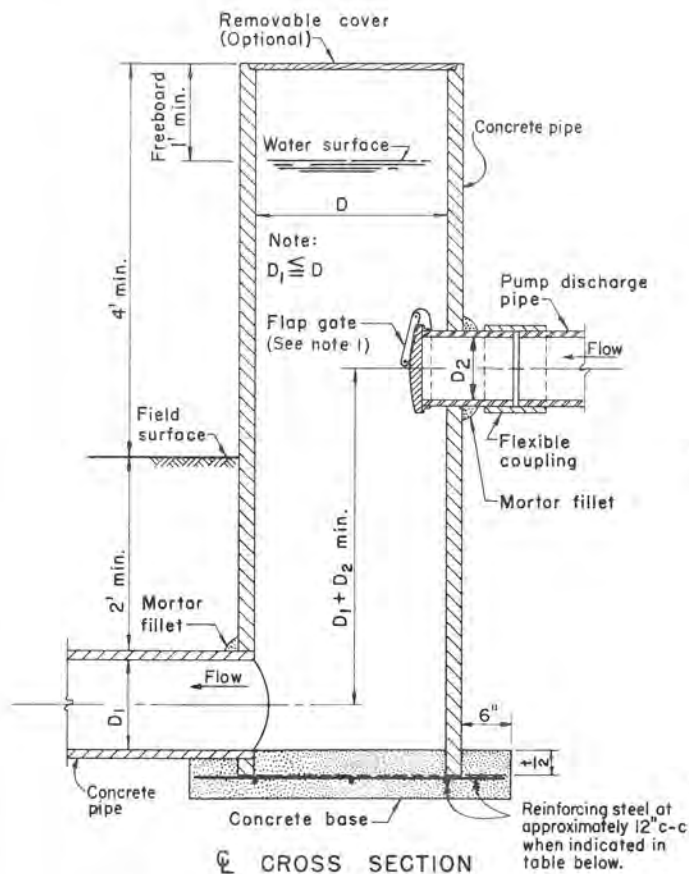
## HIGH HEAD STEEL TAPERED PUMP STAND FOR CONCRETE PIPE

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

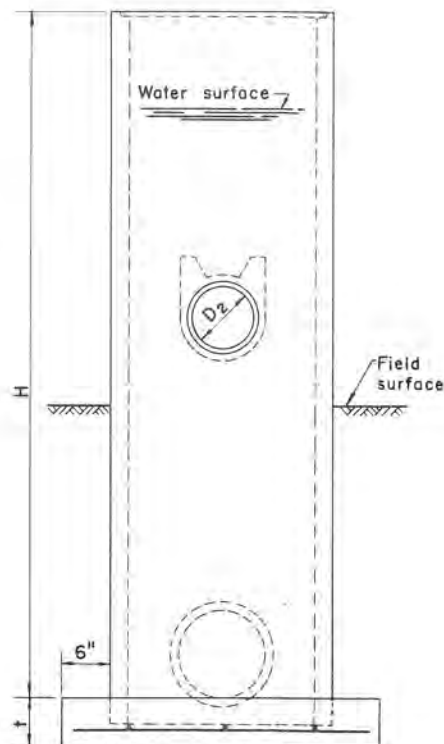
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.26-1



PLAN



CROSS SECTION



ELEVATION

Notes:

1. When  $D \leq 27"$  or when  $D_2$  is greater than  $\frac{1}{2} D$  eliminate flap gate and use a check valve in pump discharge pipe.

#### NOMENCLATURE

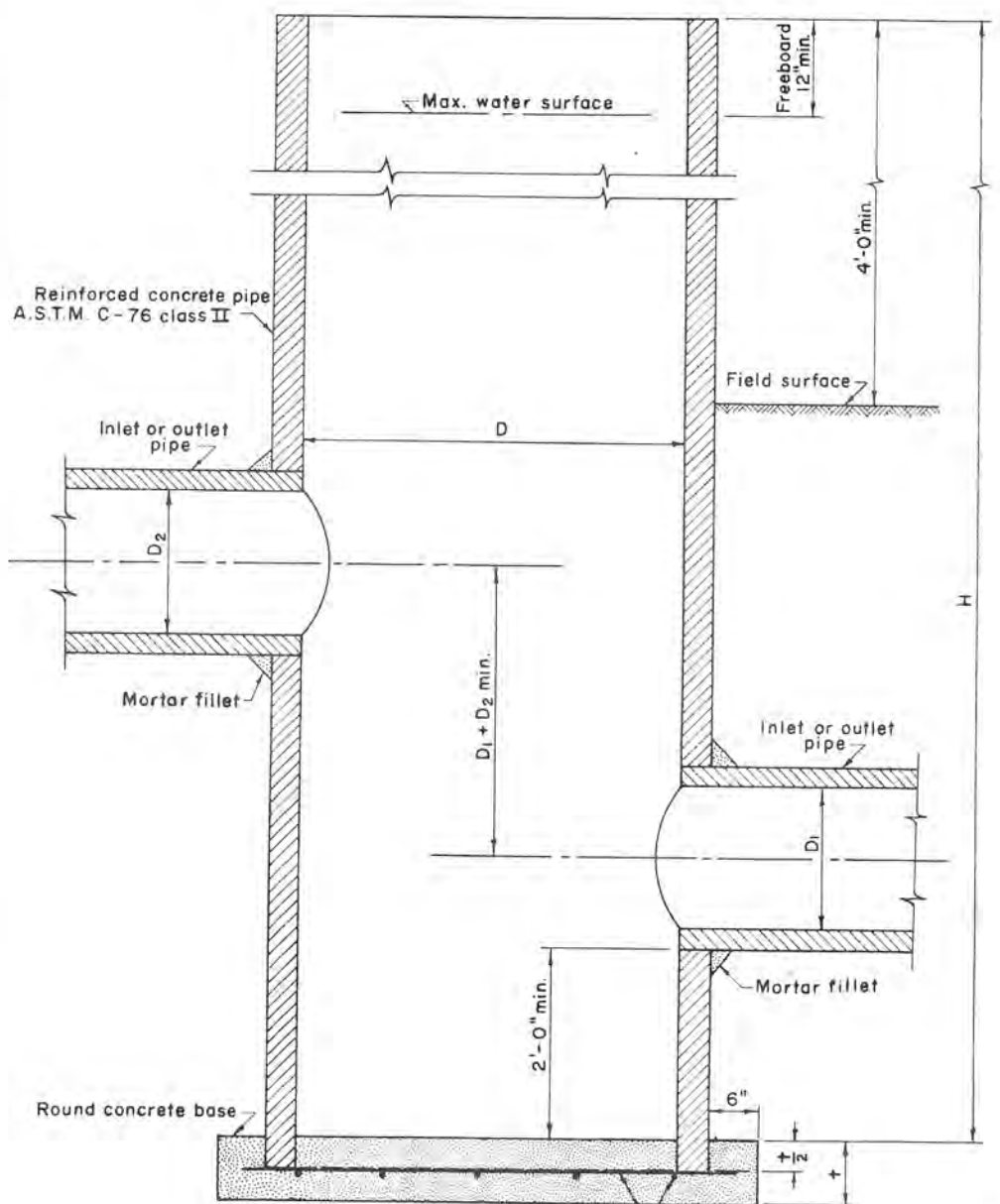
- D - Diameter of vertical pipe  
 $D_1$  - Diameter of underground pipe  
 $D_2$  - Diameter of pump discharge pipe  
t - Thickness of concrete base  
H - Height of vertical pipe above top of concrete base  
Q - Discharge through structure in cfs. and g.p.m.

Max. Q		D	A.S.T.M. Spec.		Concrete Base					
c. f. s.	g. p. m.	Inches	No.	Type	H=10' or less	H=more than 10'	Reinforcing steel			
					t	Cu. yd.	t	Cu. yd.	Size	Length
0.79	355	12	C-118	Concrete Irrigation Pipe	4"	0.05	6"	0.07	—	—
1.07	480	14			4"	0.05	6"	0.08	—	—
1.23	550	15			4"	0.06	6"	0.09	—	—
1.40	630	16			4"	0.06	6"	0.10	—	—
1.77	795	18			4"	0.07	6"	0.11	—	—
2.18	980	20			6"	0.13	8"	0.17	—	—
2.41	1080	21	C-75	Class II Reinforced Concrete Pipe	6"	0.14	8"	0.18	—	—
3.14	1410	24			6"	0.16	8"	0.22	—	—
3.98	1785	27			6"	0.20	8"	0.26	$\frac{3}{8}"$	19'
4.91	2205	30			6"	0.23	8"	0.30	$\frac{3}{8}"$	21'
5.94	2665	33			8"	0.35	8"	0.35	$\frac{3}{8}"$	22'
7.07	3175	36			8"	0.39	8"	0.39	$\frac{3}{8}"$	23'
9.62	4320	42			8"	0.50	8"	0.50	$\frac{3}{8}"$	38'
12.57	5640	48			8"	0.62	8"	0.62	$\frac{1}{2}"$	46'

#### HIGH HEAD NON-TAPERED PUMP STAND FOR CONCRETE PIPE

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000-27-1



CROSS SECTION

Reinforcing steel at approximately 12" c-c both ways. Size as shown in table below.

#### NOMENCLATURE

D = Diameter of vertical concrete pipe

D<sub>1</sub> = Diameter of inlet or outlet pipe

D<sub>2</sub> = Diameter of inlet or outlet pipe

t = Thickness of concrete base

H = Height of vertical concrete pipe above top of concrete base

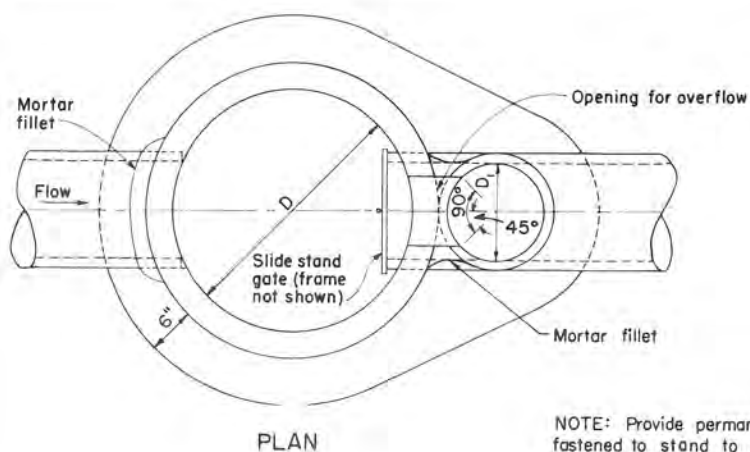
Q = Discharge through structure in c.f.s. and g.p.m.

Max. Q		D	Concrete Base					
			H=10' or less		H=more than 10'		Reinforcing steel	
c.f.s.	g.p.m.	Inches	t	cu.yd.	t	cu. yd.	Size	Length
1.22	550	30	6"	.23	8"	.30	3/8"	21'
1.49	670	33	8"	.35	8"	.35	3/8"	22'
1.77	795	36	8"	.39	8"	.39	3/8"	23'
2.40	1075	42	8"	.50	8"	.50	3/8"	38'
3.14	1410	48	8"	.62	8"	.62	1/2"	46'
3.98	1785	54	8"	.76	8"	.76	1/2"	53'
4.90	2200	60	8"	.91	8"	.91	1/2"	71'

#### CONCRETE PIPE SAND TRAP FOR CONCRETE PIPE LINE

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPLETE	CHECKED	DATE	DRAWING NO.
		1-64	50-19000 28-1



NOTE: Provide permanent ladder fastened to stand to provide access to gate wheel.

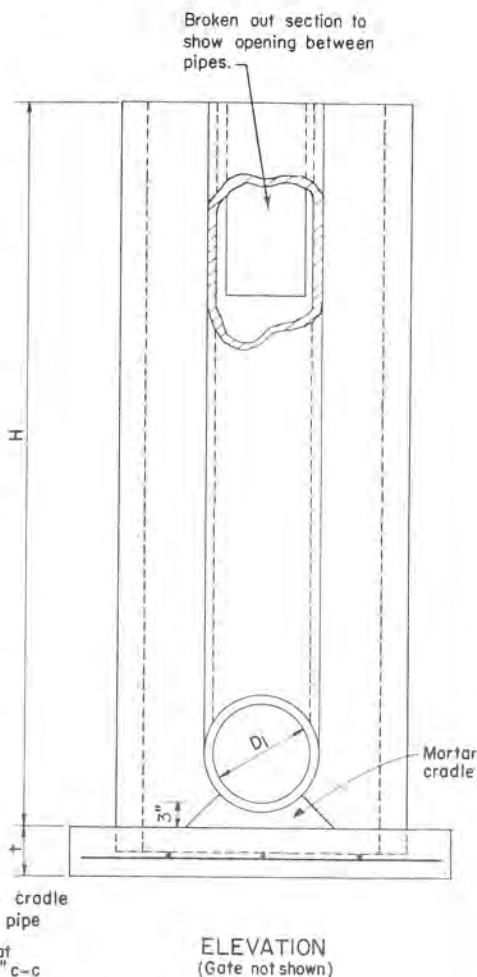
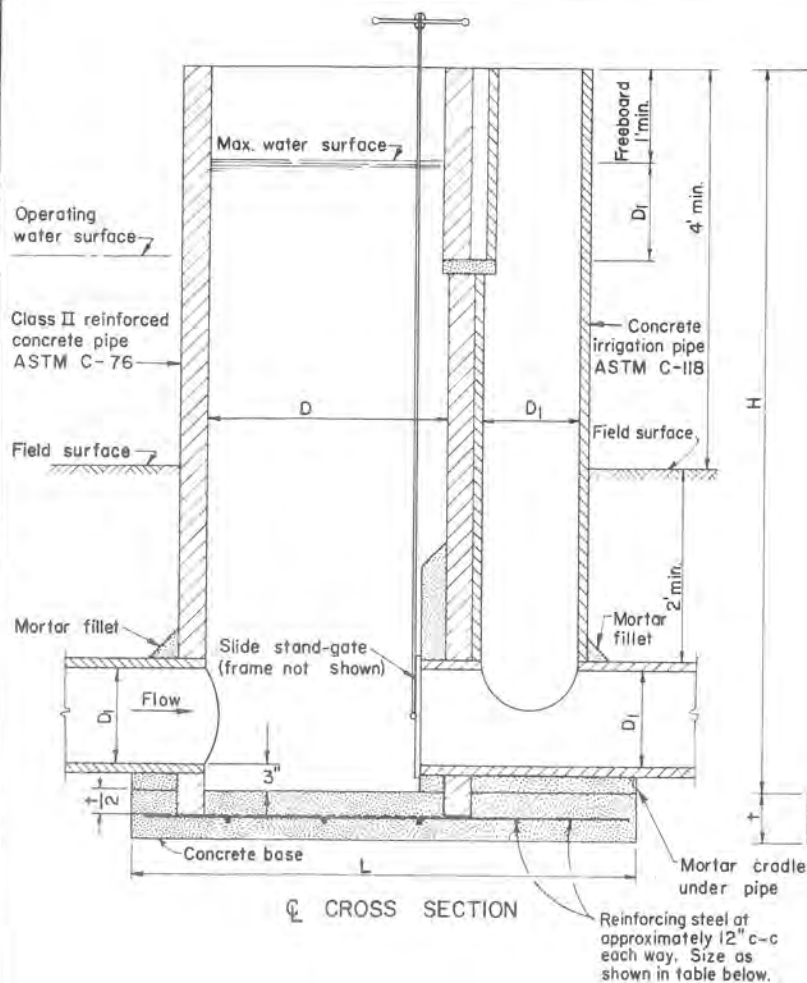


TABLE OF DIMENSIONS AND QUANTITIES

D <sub>1</sub>	D	L	Concrete Base				Reinforcing steel
			H=10' or less	H=more than 10'	H=more than 10'	H=more than 10'	
Inches	Inches	Feet - Inches	Inches	Cu. yd.	Inches	Cu. yd.	Size Lgth. ft.
8	30	4'-10 1/2"	6	0.31	8	0.41	3/8" 24
10	30	5'-0 1/2"	6	0.32	8	0.42	3/8" 25
12	30	5'-2 3/4"	6	0.34	8	0.44	3/8" 26
14	30	5'-5"	6	0.36	8	0.46	3/8" 27
15	30	5'-6"	6	0.37	8	0.47	3/8" 28
16	30	5'-7 1/4"	6	0.38	8	0.48	3/8" 29
18	30	5'-9 1/2"	6	0.39	8	0.50	3/8" 31
20	42	7'-1 3/4"	8	0.75	8	0.75	3/8" 53
21	42	7'-3"	8	0.77	8	0.77	3/8" 53
24	48	8'-1 3/4"	8	0.97	8	0.97	1/2" 64

NOMENCLATURE

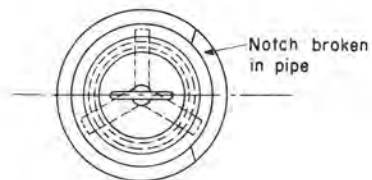
D - Diameter of concrete stand pipe  
D<sub>1</sub> - Diameter of underground concrete pipe and concrete overflow pipe  
H - Height of structure  
† - Thickness of concrete base

OVERFLOW GATE STAND  
for  
CONCRETE PIPE LINES

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPILED CHECKED DATE 1-64 DRAWING NO. 5,0-19,000,29-1

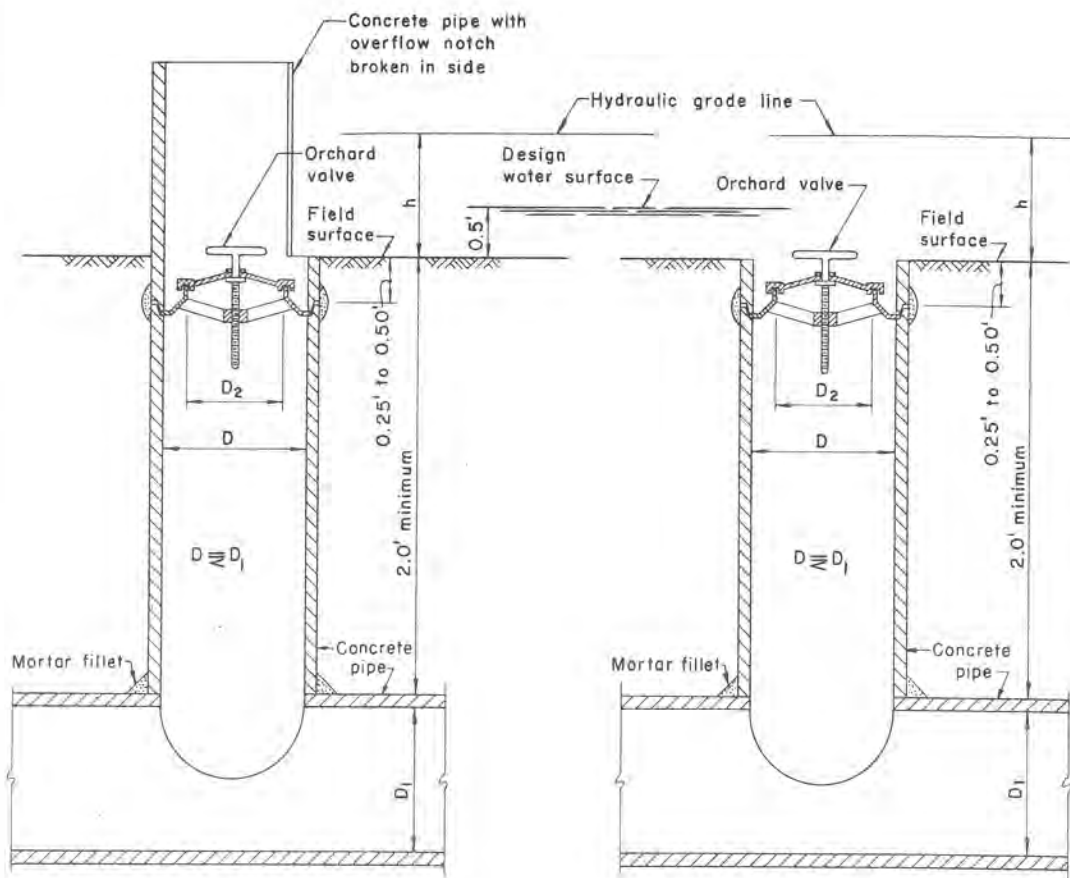




PLAN

# NOMENCLATURE

- D - Diameter of concrete riser pipe
- D<sub>1</sub> - Diameter of underground concrete pipe
- D<sub>2</sub> - Diameter of valve outlet
- h - Height of hydraulic grade line above field surface



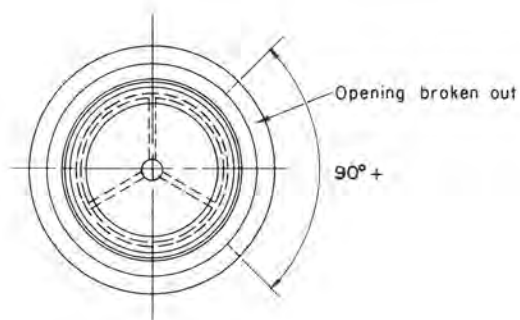
TYPE I  
 ☿ CROSS SECTION

TYPE II  
 ☿ CROSS SECTION

## ORCHARD VALVE OUTLET FOR CONCRETE PIPE LINES

U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

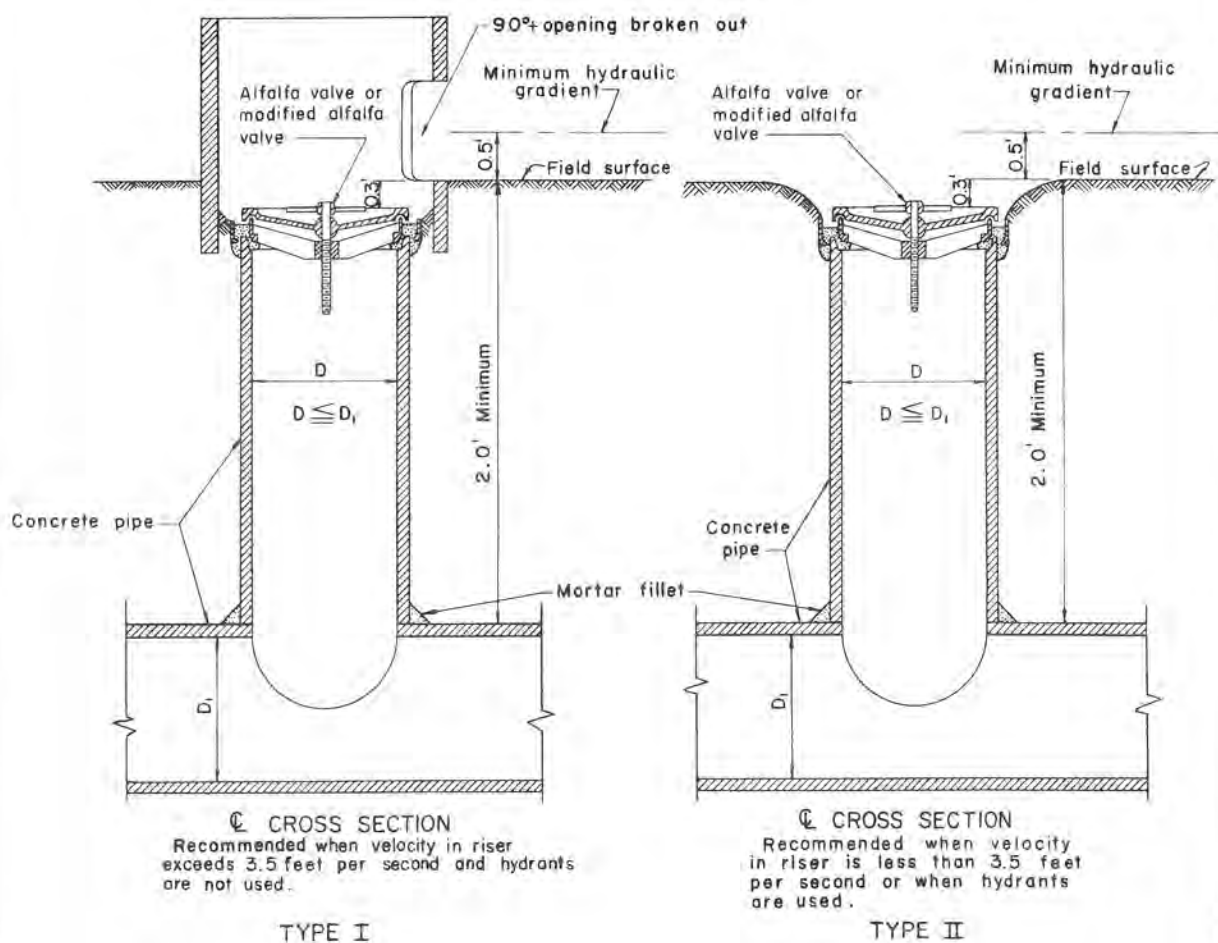
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.30-1



PLAN

NOMENCLATURE

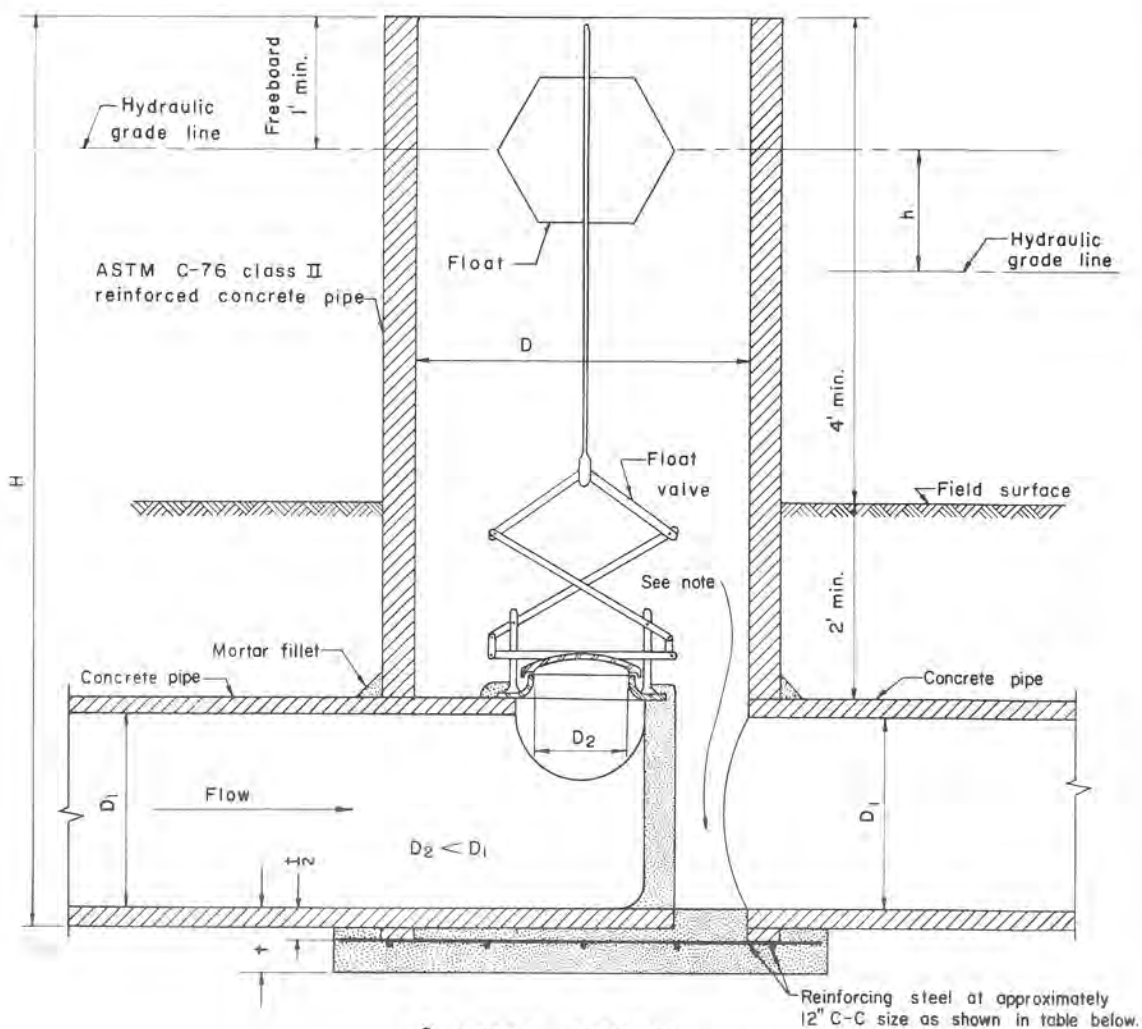
- D—Diameter of riser pipe and nominal diameter of alfalfa gate  
 $D_1$ —Diameter of underground concrete pipe



ALFALFA VALVE or MODIFIED ALFALFA VALVE OUTLET for CONCRETE PIPE LINES

U. S. DEPARTMENT OF AGRICULTURE  
 SOIL CONSERVATION SERVICE

COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.31-1



CL CROSS SECTION

Note: 1. Provide an outlet area equal to or greater than the area of the valve (whose diameter is  $D_2$ ).

#### NOMENCLATURE

- $D$  - Diameter of concrete stand pipe
- $D_1$  - Diameter of underground concrete pipe
- $D_2$  - Nominal diameter of float valve
- $H$  - Height of stand pipe
- $t$  - Thickness of concrete base
- $h$  - Difference in head (hydraulic grade lines) between inlet and outlet pipe

$D_2$ Nominal Inches	Design Flow Capacity and Stand Diameter											
	$h=0.5'$			$h=1.0'$			$h=2.0'$			$h=5.0'$		
	Capacity	$D$		Capacity	$D$		Capacity	$D$		Capacity	$D$	
	c.f.s.	g.p.m.	in.	c.f.s.	g.p.m.	in.	c.f.s.	g.p.m.	in.	c.f.s.	g.p.m.	in.
4	0.32	145	30	0.45	200	30	0.64	285	30	1.01	455	30
5	0.50	225	30	0.71	320	30	1.00	450	30	1.58	710	30
8	1.28	575	30	1.81	810	30	2.56	1150	30	4.05	1820	30
12	2.87	1290	30	4.07	1825	30	5.75	2580	33	9.10	4085	42
16	5.12	2300	33	7.24	3250	42	10.23	4590	48	16.17	7260	60

TABLE OF QUANTITIES

$D$ Inches	Concrete base					
	$H=10'$ or less		$H=\text{more than } 10'$		Rein. steel	
	$t$	cu. yd.	$t$	cu. yd.	size	length
3.0	6"	0.23	8"	0.30		21'
3.3	8"	0.35	8"	0.35		22'
4.2	8"	0.50	8"	0.50		38'
4.8	8"	0.62	8"	0.62		46'
6.0	8"	0.91	8"	0.91		71'

NON-BALANCED FLOAT VALVE STANDS for CONCRETE PIPE LINES			
U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE			
COMPILED	DESIGNED	DATE	REVISION NO.
		1-64	5,0-19,000.32-1

When the hydraulic gradient is more than 20 feet above the ground and protection from excessive water pressure is not required, an air release valve of the same nominal diameter as the pipe may be used in place of the tall vent pipe

Freeboard 1' min. for open vent.

Hydraulic gradient

Air relief valve

Steel pipe

Field surface

2' Min. vent

4' min. for open vent

$D_4$  (Nominal dia.)

Mortar

Precast concrete reducer

Concrete pipe

Mortar fillet

$D_3$

$D_1$  min.

2' - min.

$D_1$

D <sub>1</sub> Inches	D <sub>3</sub> Min. Inches	D <sub>4</sub> Min. Nominal Dia. Inches
8	6	2
10	8	2
12	10	2
14	10	2
15	12	2
16	12	2 1/2
18	14	2 1/2
20	16	3
21	16	3
24	18	3 1/2

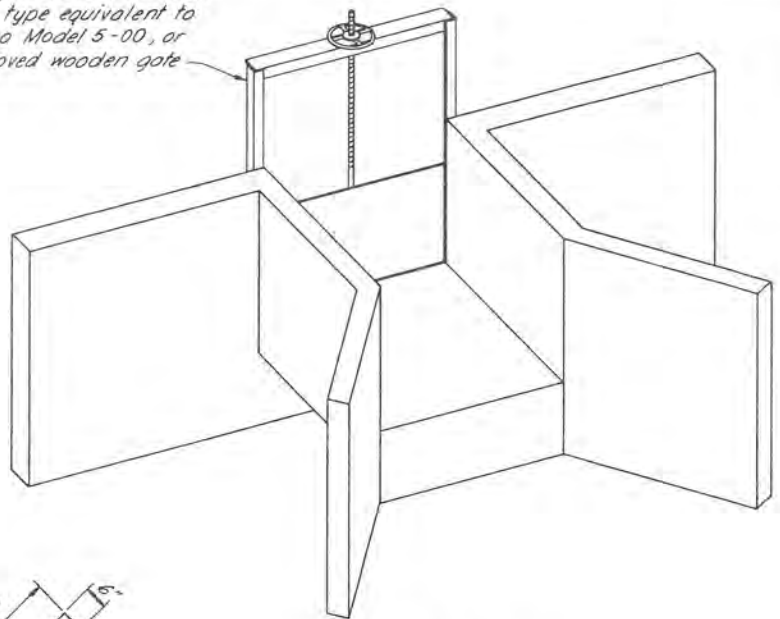
D<sub>1</sub>- Diameter of underground concrete pipe  
D<sub>3</sub>-Diameter of concrete vent pipe  
D<sub>4</sub>-Diameter (nominal) of steel vent pipe

<h1 style="text-align: center;">VENT FOR CONCRETE PIPE LINES</h1>			
<h2 style="text-align: center;">U. S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE</h2>			
COMPILED	CHECKED	DATE	DRAWING NO.
		1- 64	50-19,000,33-1

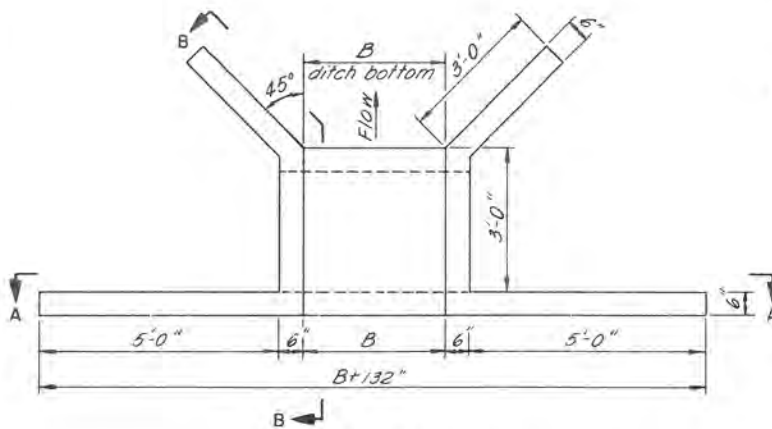
Headgate to be flat back steel type equivalent to Armco Model 5-00, or approved wooden gate

TABLE OF QUANTITIES

B	Concrete Cu. Yds.	Reinforcing steel Lbs.
3'-0"	2.24	154
4'-0"	2.37	163
6'-0"	2.58	180



ISOMETRIC VIEW

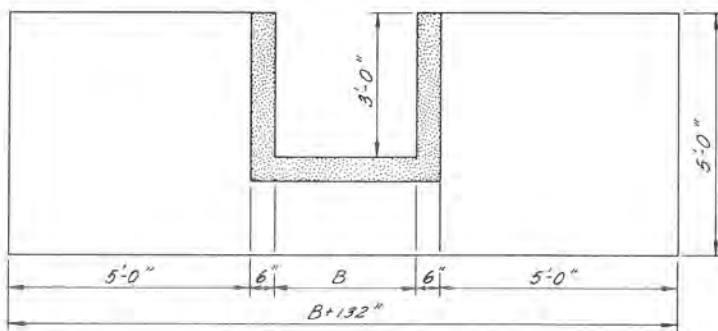


PLAN

HEADGATE NOT SHOWN

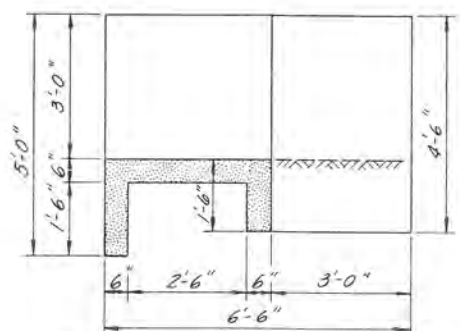
Notes:

1. Reinforcing steel to be  $\frac{1}{2}"$  diameter bars approximately 12" center to center, placed in center of slab.
2. Chamfer all exposed edges  $\frac{3}{4}"$ .
3. B = bottom width of ditch.



ELEVATION A-A

HEADGATE NOT SHOWN



SECTIONAL ELEVATION B-B

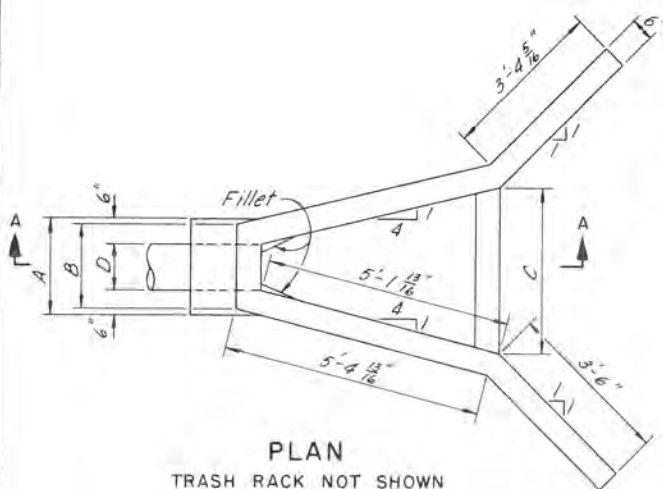
HEADGATE NOT SHOWN

CONCRETE HEADGATE STRUCTURE

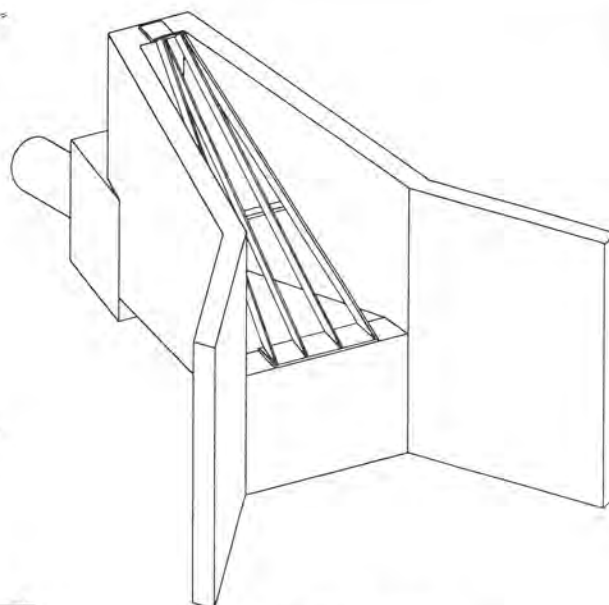
B = 3'-0", 4'-0", 6'-0"

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

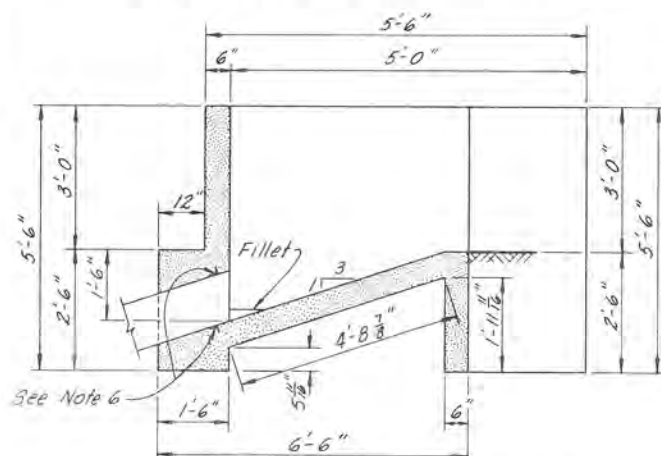
COMPLETED	CHECKED	DATE	DRAWING NO.
		1-64	50-19,000.34-1



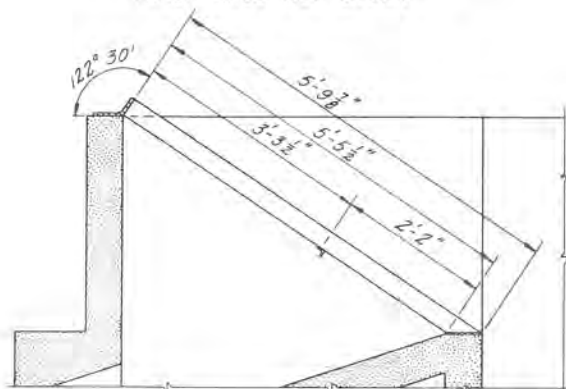
PLAN  
TRASH RACK NOT SHOWN



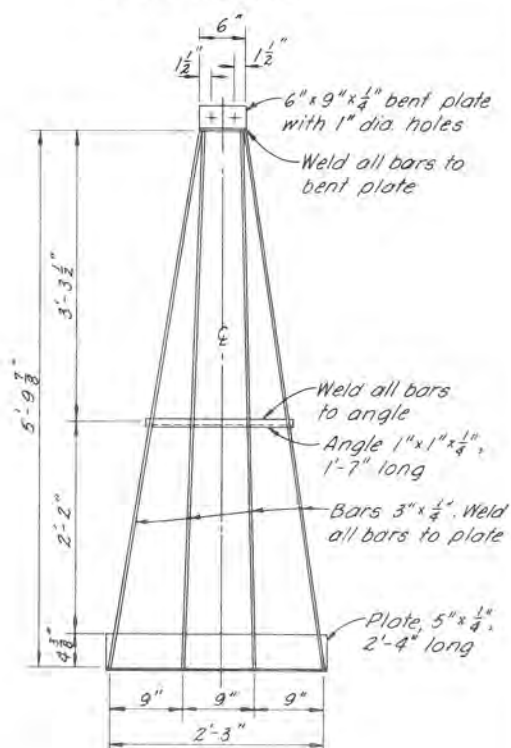
ISOMETRIC VIEW



SECTIONAL ELEVATION A-A  
TRASH RACK NOT SHOWN



TRASH RACK DETAIL



Notes:

1. All concrete is Class B.
2. All reinforcing steel to be  $\frac{1}{2}$ " dia. placed 12" center to center in center of slabs.
3. Round corners at entrance to pipe and place fillets in corners after forms are removed.
4. Pipe ends can be mitered to avoid additional forming.
5. Clear distance of reinforcing steel to outside face (dirt side) to be 2".
6. Weld  $2 \times 2 \times \frac{1}{4}$ " angle irons, 3" long at quarter points, 4" from end on smooth metal pipe to provide bond.
7. Minimum height of fill over pipe to be 3'.

TABLE OF DIMENSIONS AND QUANTITIES

PIPE DIA.	DIMENSIONS				REINFORCING STEEL Lbs.	CONCRETE Cu. Yds.
	A	B	C	D		
8"	1'-8"	1'-5"	3'-2"	0'-8"	175	2.25
10"	2'-0"	1'-9"	3'-6"	1'-0"	178	2.35
12"	2'-0"	1'-9"	3'-6"	1'-0"	178	2.34
15"	2'-3"	2'-0"	3'-9"	1'-3"	181	2.40

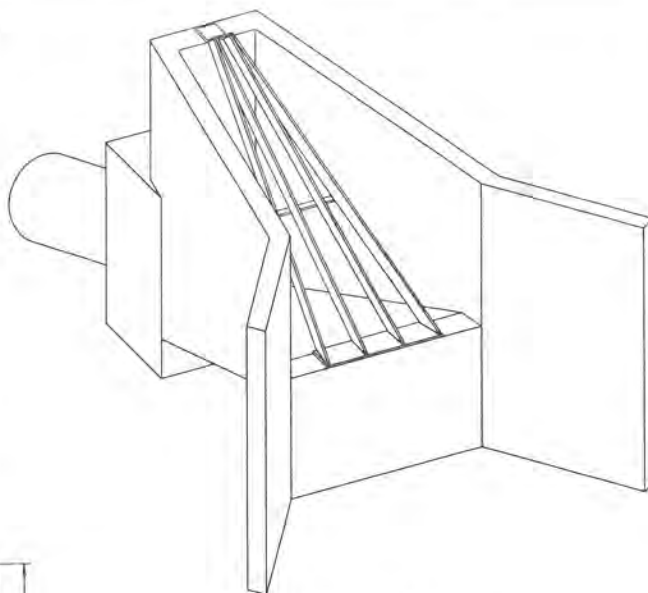
Total structural steel = 76 lbs.

CONCRETE SIPHON INLET AND  
OUTLET FOR 8" TO 15" DIA. PIPE

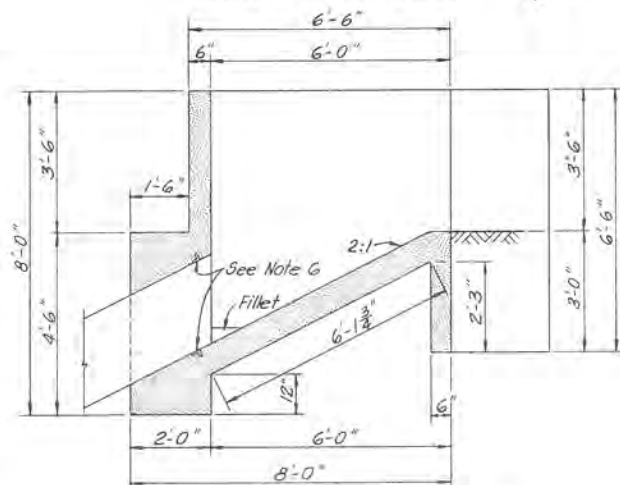
U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

COMPLETED	DRAWN	DATE	DRAWING NO.
		1-64	5,0-19,000,35-1

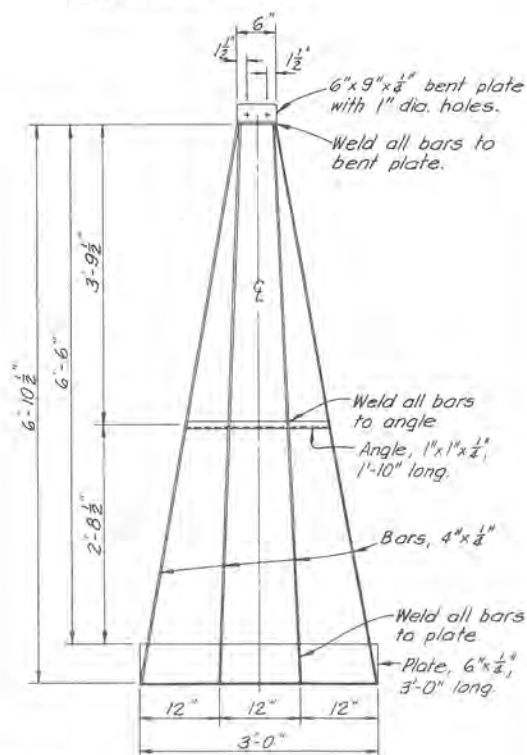
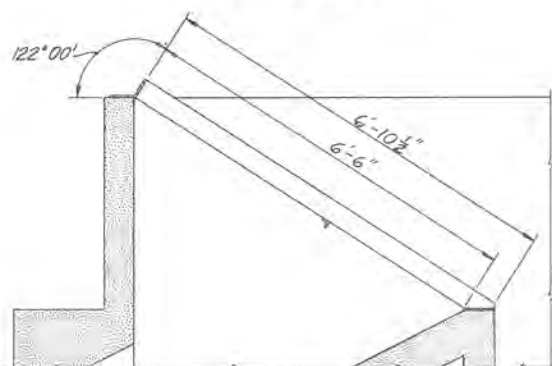




ISOMETRIC VIEW



SECTIONAL ELEVATION A-A  
TRASH RACK NOT SHOWN



TRASH RACK DETAIL

### TABLE OF QUANTITIES AND DIMENSIONS FOR DIFFERENT PIPES

PIPE DIA.	DIMENSIONS				REIN- FORCING STEEL LB.	CON- CRETE CU.YD.
	A	B	C	D		
16"	2'-6"	2'-3"	4'-6"	1'-6"	259.5	3.67
18"	2'-6"	2'-3"	4'-6"	1'-6"	259.5	3.67
20"	2'-9"	2'-6"	4'-9"	1'-9"	261.5	3.78
21"	2'-9"	2'-6"	4'-9"	1'-9"	261.5	3.76
22"	3'-0"	2'-9"	5'-0"	2'-0"	264.5	3.88
24"	3'-0"	2'-9"	5'-0"	2'-0"	264.5	3.84

NOTE: Total structural steel = 118 lbs.

- NOTES:
1. All concrete is class B
  2. All reinforcing steel to be  $\frac{1}{2}$ " dia. placed 12" C-C. in center of slabs.
  3. Round corners at entrance to pipe and place fillets in corners after forms are removed.
  4. Pipe ends can be mitered to avoid additional forming.
  5. Clear distance of reinforcing steel to outside face (dirt side) of concrete to be 2"
  6. Weld 2"x2"x $\frac{1}{4}$ " angle irons 6" long, at quarter points, 4" from end, on smooth metal pipe to provide bond.
  7. Minimum height of fill over pipe to be three feet.

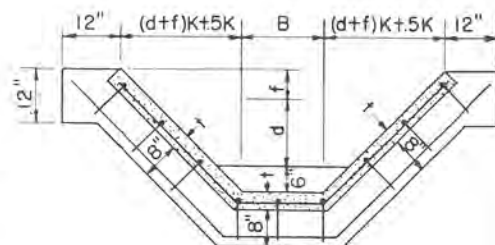
CONCRETE SIPHON INLET AND  
OUTLET FOR 16" TO 24" DIA PIPES

U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

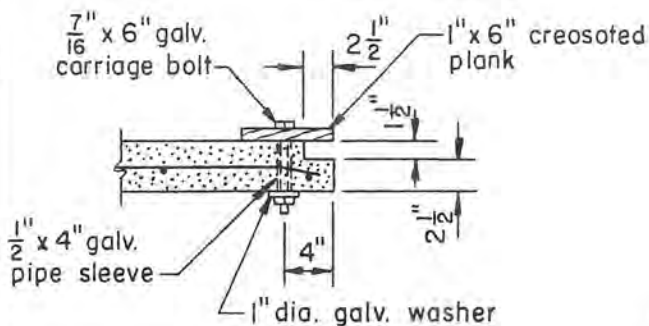
COMPLET	DECEDE	DATE	AMOUNT PAID
		1-64	5,019,000.35-2

# LENGTH OF TRANSITION REQUIRED AT INLET OF CHUTE FOR VARYING DISCHARGES AND SLOPES

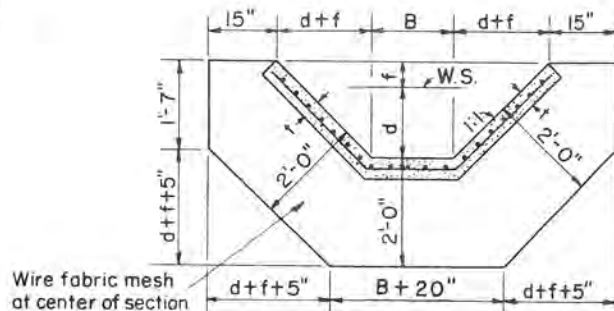
Slope %	Q = 3.0 C.F.S. d = 1.1', B = 12", B <sub>i</sub> = 5"		Q = 4.0 C.F.S. d = 1.0', B = 18", B <sub>i</sub> = 5"		Q = 5.0 C.F.S. d = 1.2', B = 18", B <sub>i</sub> = 5"	
	(L) feet	d <sub>i</sub> + f <sub>i</sub> inches	(L) feet	d <sub>i</sub> + f <sub>i</sub> inches	(L) feet	d <sub>i</sub> + f <sub>i</sub> inches
6	10	9	15	10	19	10
8	9	9	14	10	18	10
10	8	9	13	9	17	10
12	7	8	11	9	15	9
15	6	8	9	9	13	9



SECTION A-A



DETAIL OF GATE SLOT



SECTION B-B

## NOTES:

Reinforcement in structure to be  $\frac{3}{8}$ " bars placed in center of slabs and spaced 12" c - c both ways. All longitudinal bars to be bent into cutoffs. Wire mesh may be substituted if equivalent cross-sectional area is provided.

Provide dummy joints 8' on centers by cutting with a trowel or mason's sidewalk jointer. Dummy joint should not exceed  $\frac{3}{4}$ " in depth.

## NOMENCLATURE

- B = Base width of chute entrance or turnouts
- B<sub>i</sub> = Base width of chute
- b = Base width of earth ditch
- d = Depth of water in ditch
- d<sub>i</sub> = Depth of water in chute
- f = Freeboard at chute entrance, outlet or at turnout - Min. 6"
- f<sub>i</sub> = Freeboard in chute section - Min. 4"
- K = Side slope factor
- L = Length of transition
- S = Slope of chute
- Q = Discharge in cu. ft. per sec.
- t = Thickness of concrete lining - Min. thickness 3"

## INLET & OUTLET STRUCTURES FOR CONCRETE CHUTE

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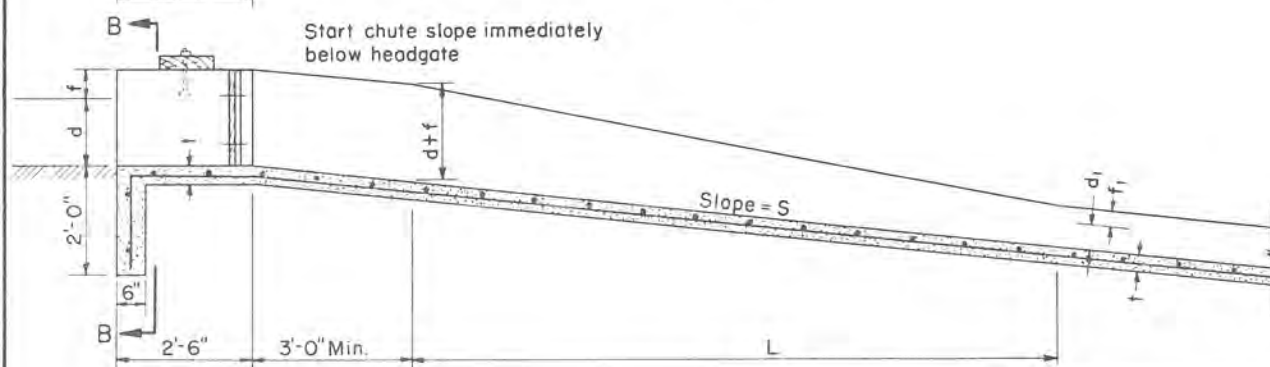
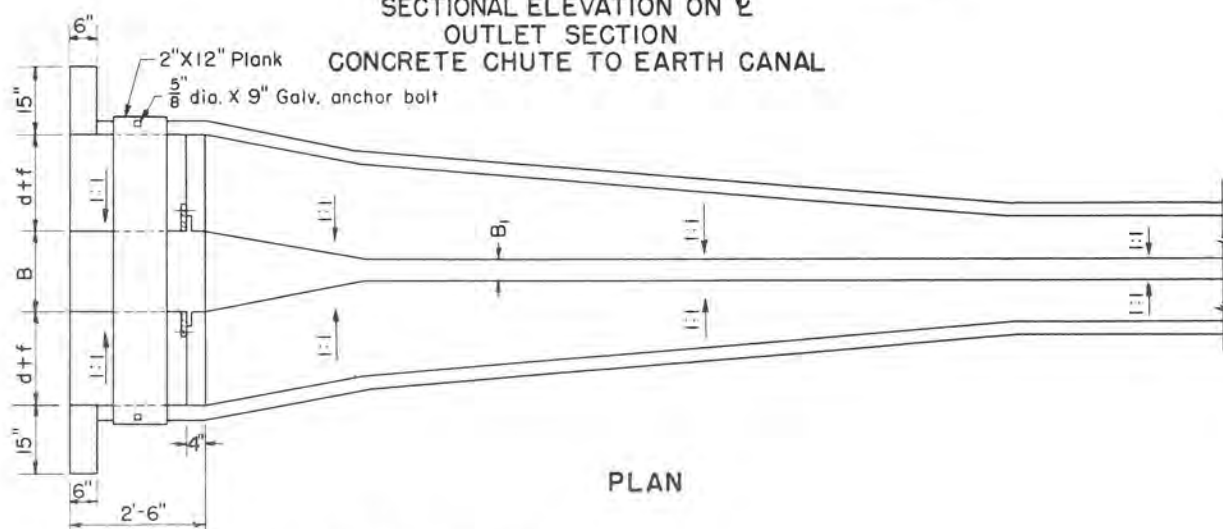
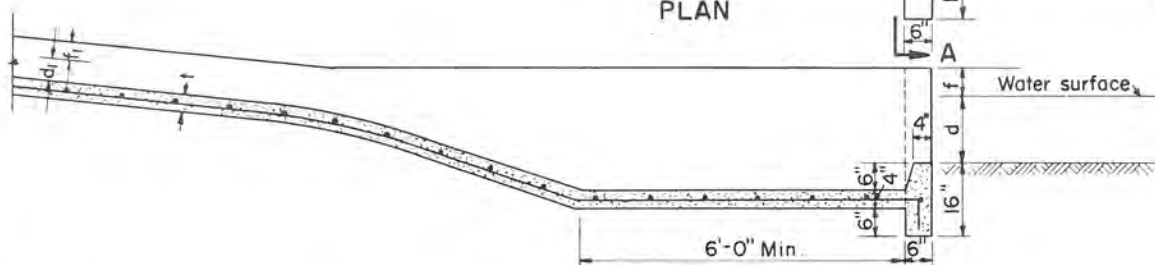
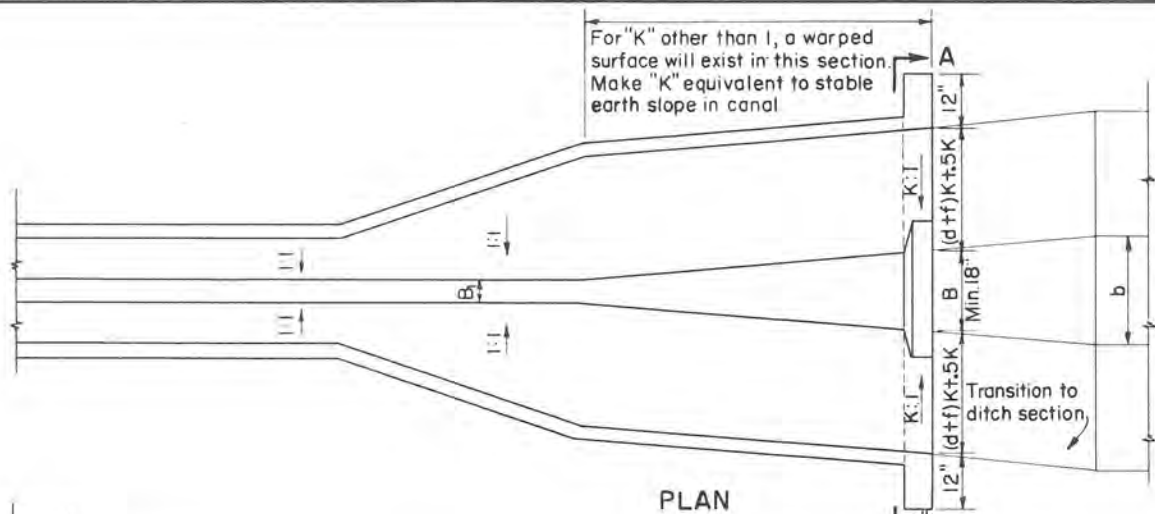
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DATE

DRAWING NO.

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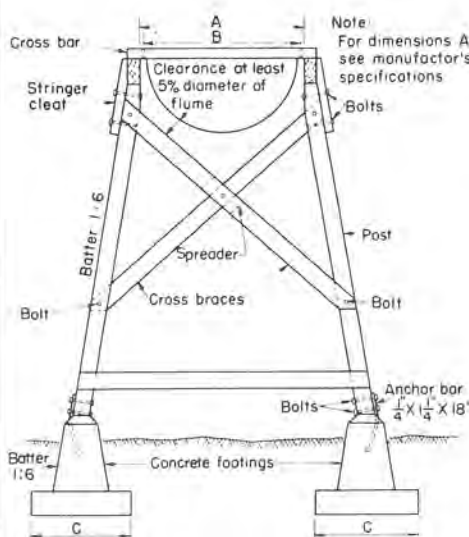
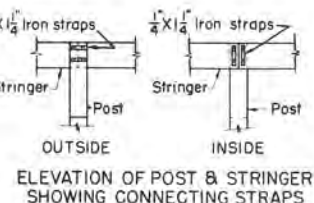
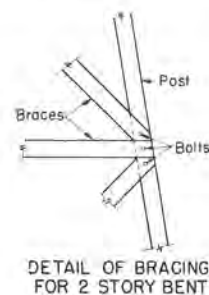
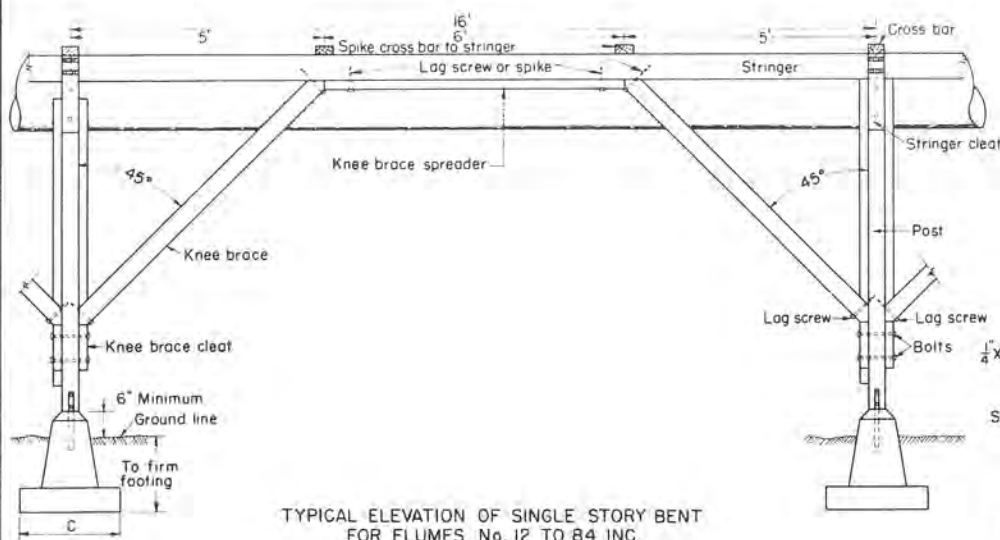
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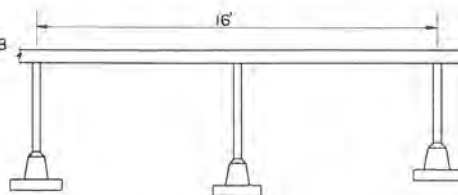
# INLET & OUTLET STRUCTURES FOR CONCRETE CHUTE

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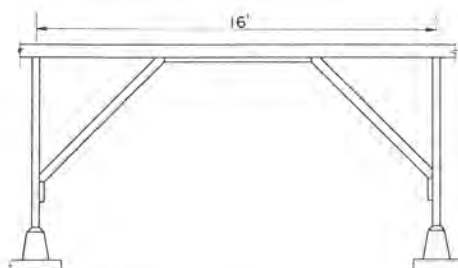
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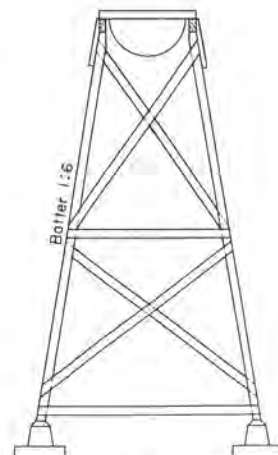
TYPICAL SECTION OF SINGLE STORY BENT  
FOR FLUMES No. 12 TO 84 INC.



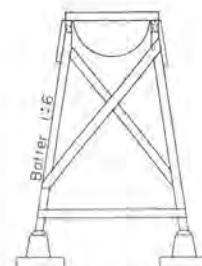
For flumes less than 5' high use intermediate post  
as shown above.



For flumes over 5' high use knee braces as  
shown above.



TWO STORY BENT FOR USE WITH  
No. 12 TO 84 FLUME 16' TO 20' HIGH



SINGLE STORY BENT FOR USE  
WITH No. 12 TO 84 FLUME  
LESS THAN 16' HIGH

Timber substructure specifications for semi-circular metal flumes Based on using Oregon Pine, Yellow Pine or Douglas Fir for heights up to 20'. Specifications for substructures to carry larger flumes or in excess of 20' high will be designed by the Regional Engineering Division on request.

Flume No.	Top Diam.	Area Square Feet	Total wt lbs per ft full of water	Size of Substructure Timbers in Inches										Capacity in Cu. Ft. per Second				
				Posts	Cross Braces	Stringer Cleats	Stringers	Cross Braces	Knee Braces	Knee Braces	Stringers	Cross Braces	Stringers	.0005	.001	.0015	.002	.003
12	7.8	0.16	15	12	4"x4"	1"x4"	1"x4"	2"x6"	2"x4"	2"x4"	2"x4"	2"x4"	2"x4"	.084	.120	.147	.170	.211
15	9.2	0.24	22	12	4"x4"	1"x4"	1"x4"	2"x6"	2"x4"	2"x4"	2"x4"	2"x4"	2"x4"	.156	.221	.274	.316	.390
18	11.8	0.35	41	12	4"x4"	1"x4"	1"x4"	2"x6"	2"x4"	2"x4"	2"x4"	2"x4"	2"x4"	.258	.370	.449	.525	.649
24	13.8	0.62	55	12	4"x4"	2"x4"	2"x4"	2"x6"	2"x4"	2"x4"	2"x4"	2"x4"	2"x4"	.572	.820	.998	1.17	1.43
30	17.8	0.99	80	12	4"x4"	2"x4"	2"x4"	2"x6"	2"x4"	2"x4"	2"x4"	2"x4"	2"x4"	1.05	1.51	1.85	2.15	2.63
36	18.6	1.43	109	14	4"x4"	2"x4"	2"x4"	2"x6"	2"x4"	2"x4"	2"x4"	2"x4"	2"x4"	1.74	2.48	3.04	3.53	4.35
42	22.4	1.95	135	16	4"x4"	2"x4"	2"x4"	2"x6"	2"x4"	2"x4"	2"x4"	2"x4"	2"x4"	2.64	3.79	4.63	5.39	6.61
48	26.2	2.53	171	18	4"x4"	2"x4"	2"x4"	3"x6"	2"x4"	3"x4"	2"x4"	2"x4"	2"x4"	3.78	5.42	6.65	7.77	9.47
60	32.3	3.97	247	20	4"x4"	2"x6"	2"x4"	3"x6"	2"x4"	3"x4"	3"x4"	2"x4"	2"x4"	6.95	9.95	12.2	14.2	17.4
72	39.3	5.72	387	22	6"x6"	2"x6"	3"x6"	3"x6"	3"x6"	3"x6"	3"x4"	2"x4"	1.4	16.3	20.1	23.2	28.4	
84	45.2	7.81	533	24	6"x6"	2"x6"	3"x6"	6"x6"	3"x6"	3"x6"	3"x4"	3"x4"	17.3	24.7	30.5	35.2	43.1	

The above data has been compiled from specifications recommended by several manufacturers of metal flumes. Where timber sizes did not agree, the largest was chosen in every case. Capacities given allow for a freeboard equal to .06 Diameter.

\* Based on footings being placed in dry alluvial soil Bearing pressure 2000 lbs. per sq. ft.

## SUBSTRUCTURE FOR METAL FLUMES

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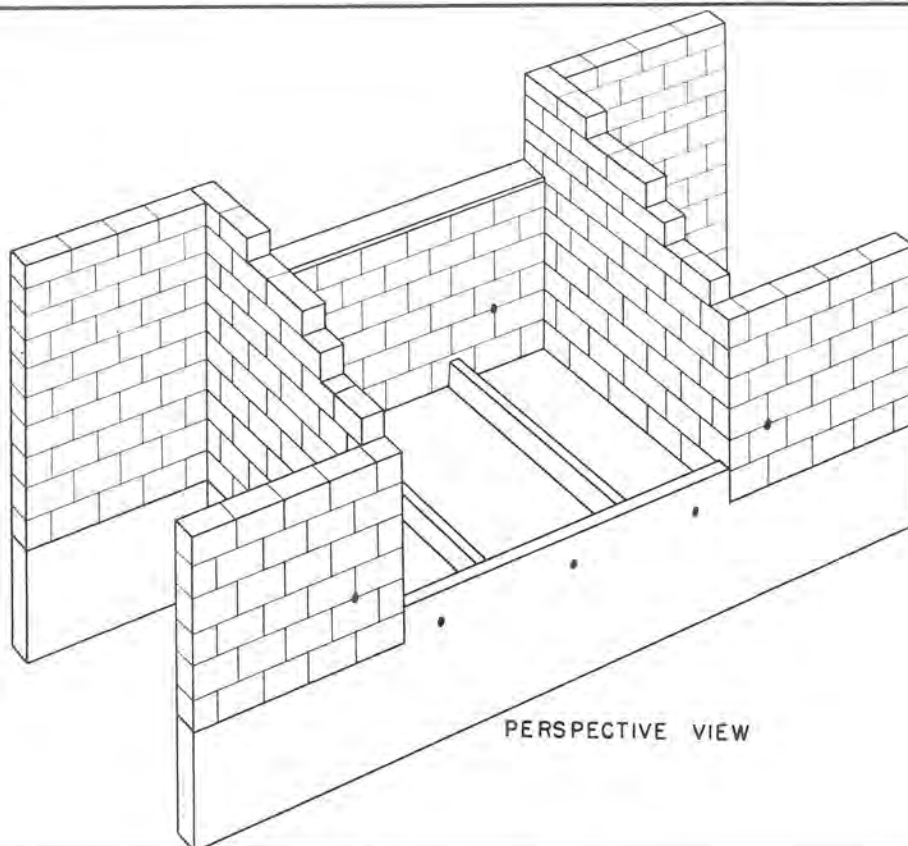
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DRAWING NO.

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SPILLWAY CAPACITIES	
Length W	Q in c.f.s.
5' - 6 1/2"	48.0
6' - 11"	60.9
8' - 3 1/2"	73.7
9' - 8"	86.5
12' - 5"	112.2
13' - 9"	124.6
15' - 1 1/2"	137.4
16' - 6"	150.2
17' - 10 1/2"	163.0
19' - 3"	176.0
$Q = 3.3(W - 0.2d)d^{3/2} \text{ c.f.s.}$	
$d = 2' - 0"$	



PERSPECTIVE VIEW

ITEM	UNIT	QUANTITIES					
		H = 3'-3 1/2"		H = 4'-0"		H = 4'-8 1/2"	
		W = 6'-11"	Add for each additional 1'-4 1/2" in spillway length W over W = 6'-11"	W = 6'-11"	Add for each additional 1'-4 1/2" in spillway length W over W = 6'-11"	W = 6'-11"	Add for each additional 1'-4 1/2" in spillway length W over W = 6'-11"
Concrete:							
Base, cutoff and toe walls, coping	cu. yds.	4.43	0.46	4.43	0.46	4.61	0.49
Core fill in blocks	"	1.83	0.039	2.01	0.046	2.21	0.054
Mortar (1/2" thick joints)	"	0.50	0.011	0.55	0.013	0.60	0.015
Gravel (for drains)	"	0.80	0.06	0.80	0.06	0.85	0.06
Concrete blocks:							
Corner blocks 8"x8"x16"	each	44	0	50	0	52	0
Half corner blocks 8"x8"x8"	"	16	0	16	0	18	0
Stretcher blocks 8"x8"x16"	"	182	5	199	6	221	7
Half stretcher blocks 8"x8"x8"	"	6	0	6	0	8	0
Reinforcing mesh for 8" wide blocks	lin. ft.	366	8.3	396	9.7	466	11
Reinforcing steel (bars)	pounds	644	52	668	54	807	61

NOTES:

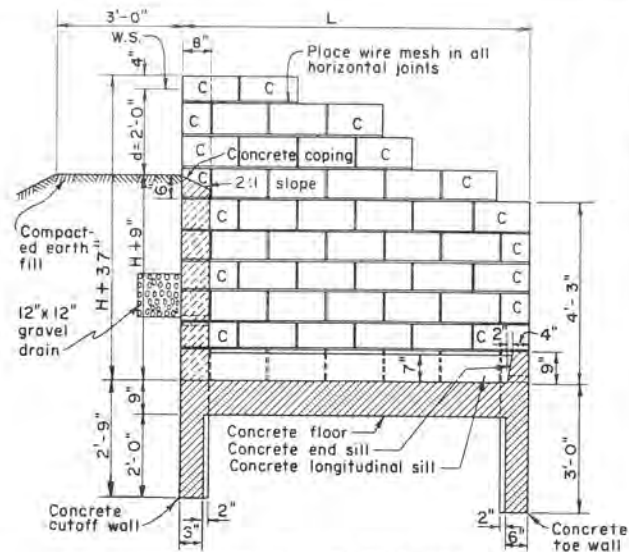
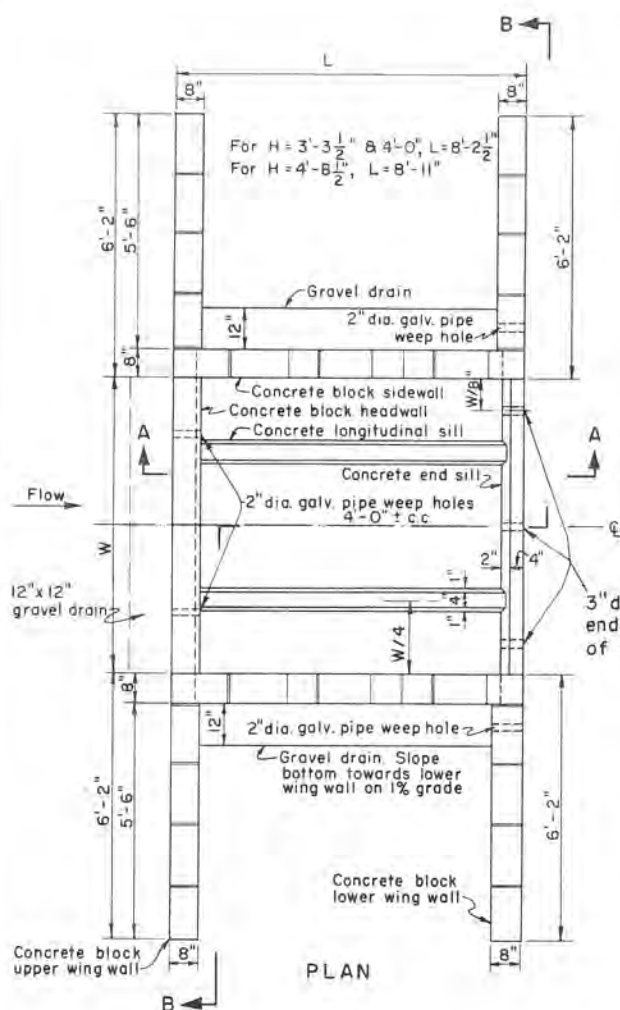
1. Main reinforcement to be 1/2" diameter and 5/8" diameter deformed bars, intermediate grade, spaced as indicated on plans. Lap 1/2" diameter bars 20 inches at splices and 5/8" diameter bars 25 inches at splices. All bars extending up from concrete floor, cutoff wall, and toe wall into concrete blocks shall be placed to match the holes in the concrete blocks. A minimum of 3/4 inch must be provided between face of holes in concrete block and sides of reinforcing bars to permit a good bond. Longitudinal bars in floor slab to be bent into toe wall and cutoff wall as shown on plans. Welded high tensile steel mesh of No. 9 wire containing two longitudinal bars, transverse bars on 16 inch centers, and diagonal bars similar to Carter-Waters Blok-Mesh shall be placed in all horizontal joints between layers of concrete blocks.
2. The joint thickness between concrete blocks shall be about 1/2 inch. The mortar for laying the concrete blocks shall be one part Portland cement to three parts sand with five pounds of hydrated lime per sack of cement added.
3. The concrete blocks shall be laid with broken vertical joints as shown on the drawing. The openings in the blocks shall be lined vertically to facilitate the placing of the vertical bars and the filling of the holes with concrete grout. Special care shall be taken when laying blocks not to partially clog the holes in the blocks with mortar. The holes shall be cleaned with a rounded stick or other suitable device before the mortar has hardened.
4. After the concrete block walls have been laid about five blocks high, the vertical steel shall be inserted in the holes and the holes shall be filled with concrete grout consisting of one part Portland cement to three parts sand with a total water content of 6.5 gallons per sack of cement. After the grout has set for twelve hours, the balance of the wall shall be laid by threading the blocks over the vertical bars. If the lift of the blocks is too high, this can be reduced by splicing the vertical bars.
5. The concrete cutoff and toe walls are to be poured against undisturbed earth where possible.
6. Place three 3 inch diameter pipes six inches long through end sill with flow line at top of floor elevation. Place one pipe on center line and one midway between each side wall and longitudinal sill.
7. Place gravel drain back of side walls as shown on plans. Slope bottom of drains on 1% grade towards lower wing walls. Place one 2 inch diameter pipe weep hole through each lower wing wall at center line of gravel drain with flow line of pipe at elevation of bottom of gravel drain at back of lower wing wall. Place gravel drain back of headwall with weep holes as shown.
8. Length of spillway crest (W) not to exceed 19'-3" where width of gully is about equal to the spillway crest length (W) and where banks are composed of heavy soil that will stand on steep slopes. Lower wing walls may be shortened or eliminated, but gravel drains shall be installed in accordance with drawing. In locations where alkali is present, paint back of all concrete block walls with two coats of emulsified asphalt.

**CONCRETE BLOCK DROP STRUCTUR FOR  
GULLY AND TERRACE OUTLET CONTROL**  
H = 3'-3 1/2", 4'-0" and 4'-8 1/2", d=2'-0"

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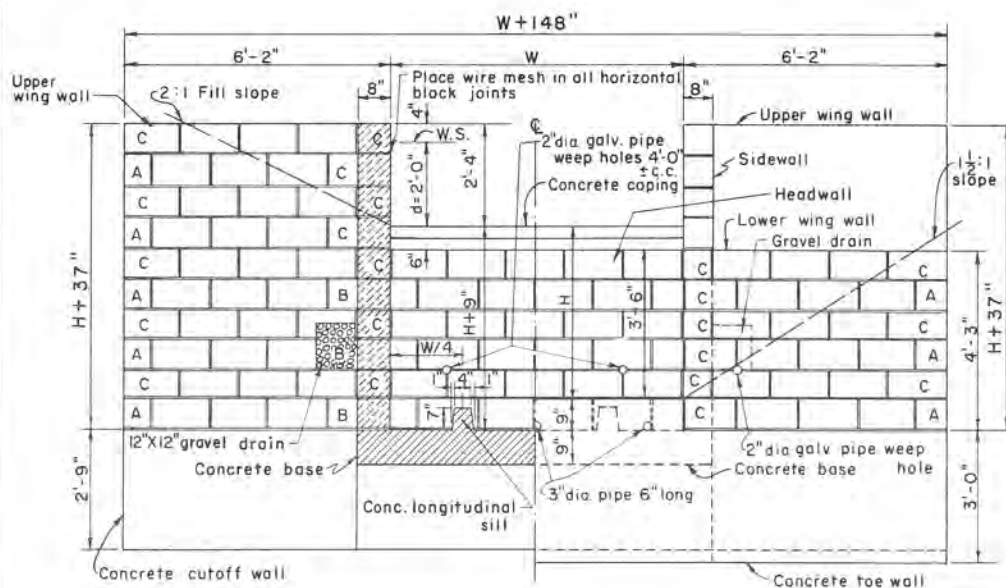
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NOMENCLATURE	
H	Height of crest of spillway above top of end sill
d	Height of water surface above crest of spillway at design flow
W	Length of spillway crest
Q	Discharge in cubic feet per second
L	Longitudinal length of structure

Note: Concrete blocks marked A are half corner blocks  $8' \times 8' \times 8'$ . Concrete blocks marked B are half stretcher blocks  $8' \times 8' \times 8'$ . Concrete blocks marked C are corner blocks  $8' \times 8' \times 16'$ . Concrete blocks not marked are stretcher blocks  $8' \times 8' \times 16'$ .



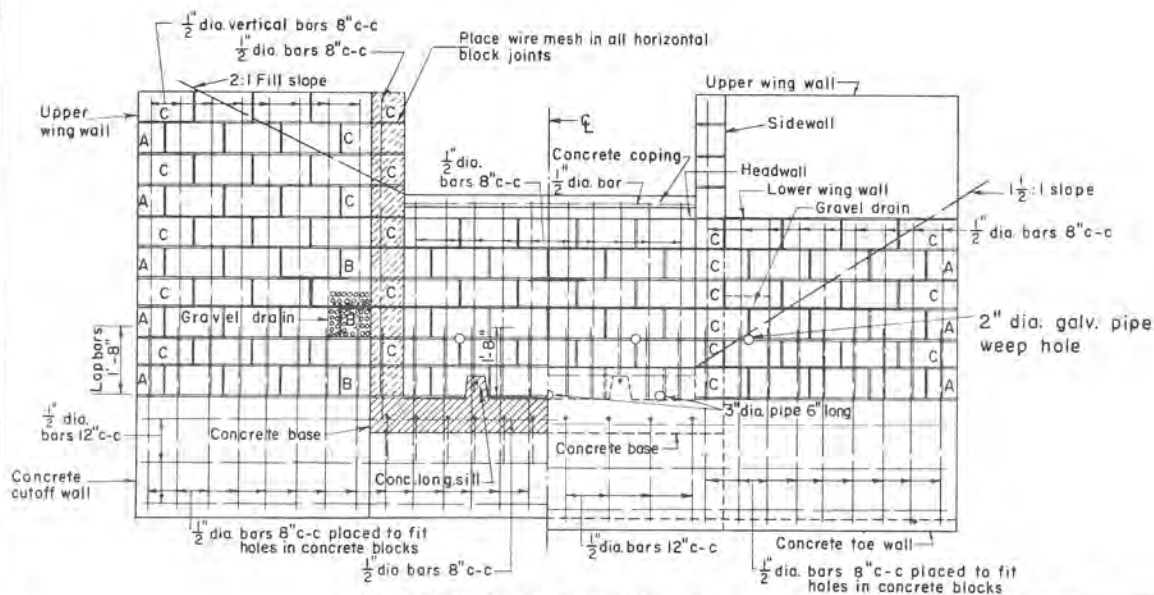
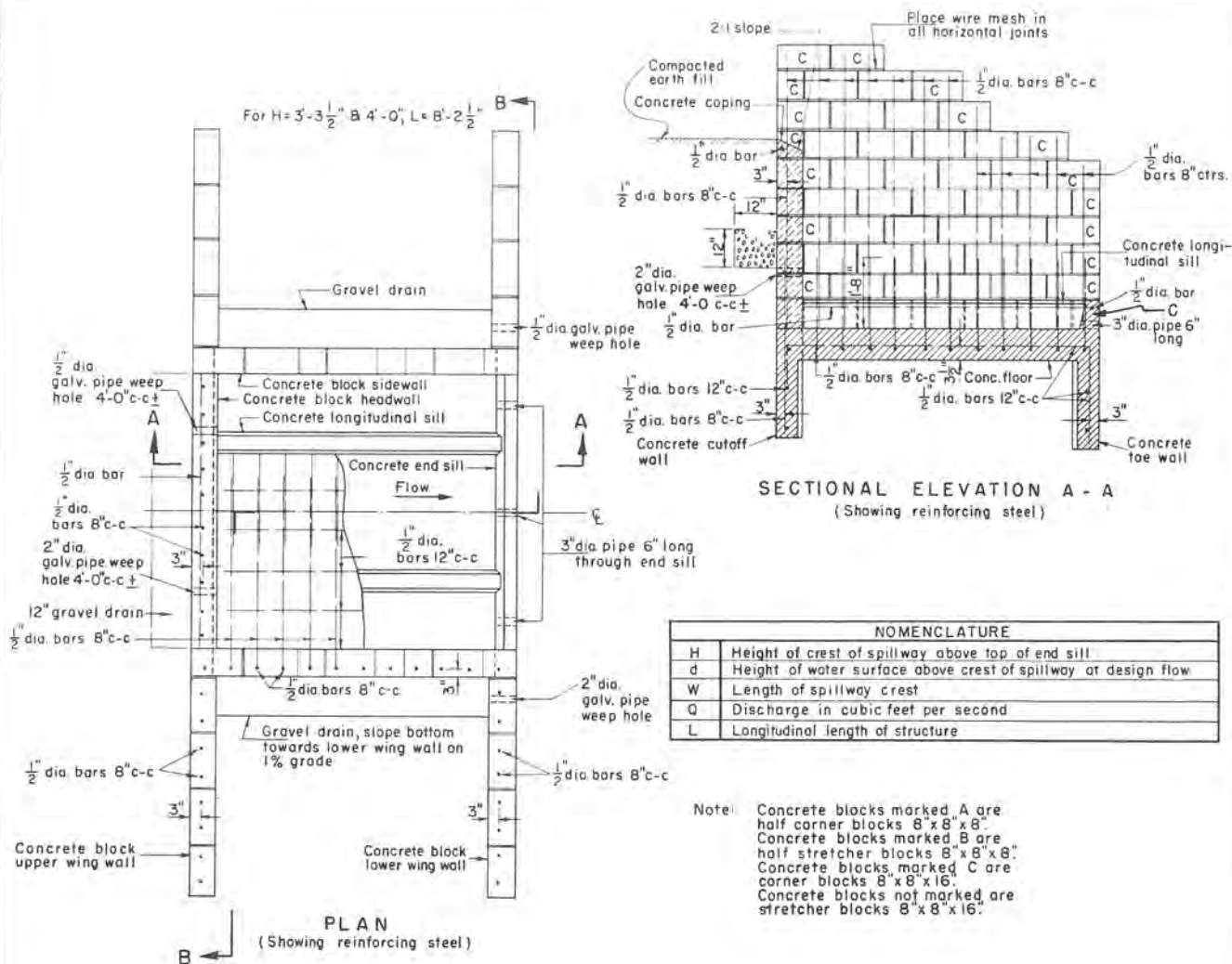
CONCRETE BLOCK DROP STRUCTURE FOR  
 GULLY AND TERRACE OUTLET CONTROL

$H = 3'-3\frac{1}{2}''$ ,  $4'-0''$  and  $4'-8\frac{1}{2}''$ ,  $d = 2'-0''$

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COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.38-1

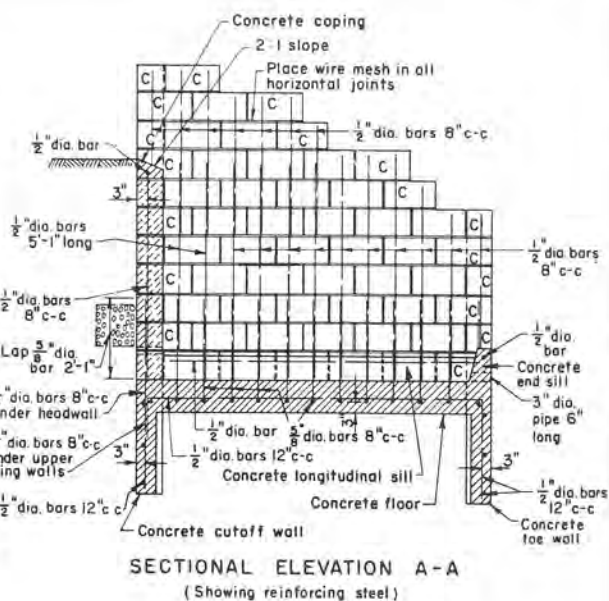
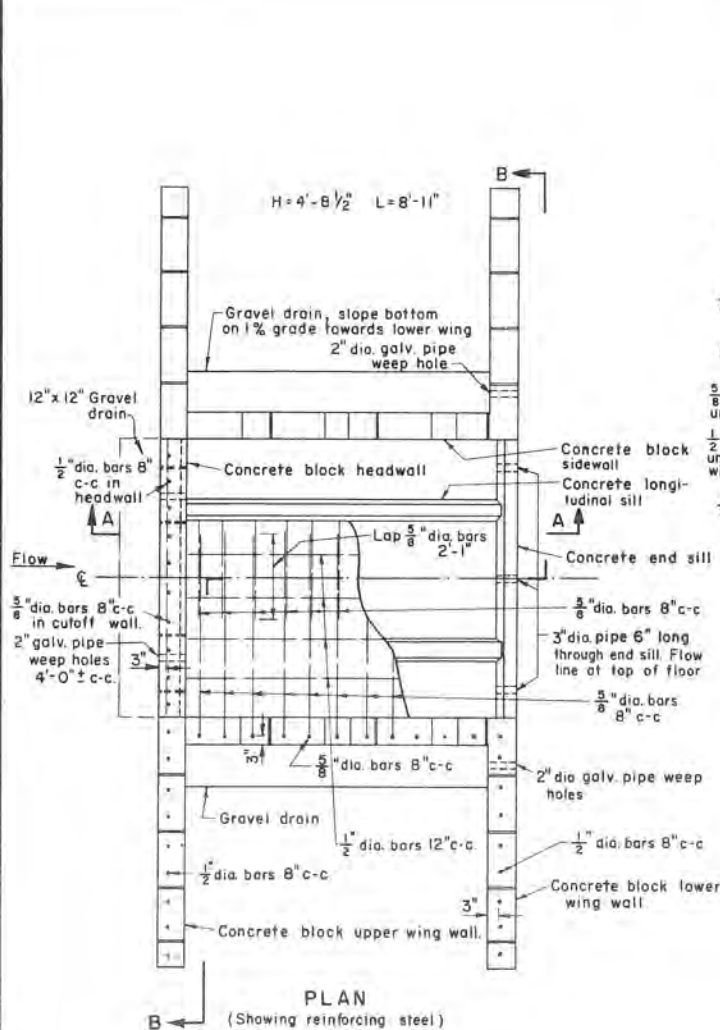




**CONCRETE BLOCK DROP STRUCTURE FOR GULLY AND TERRACE OUTLET CONTROL**  
 $H = 3'-3\frac{1}{2}"$  AND  $4'-0"$   $d = 2'-0"$

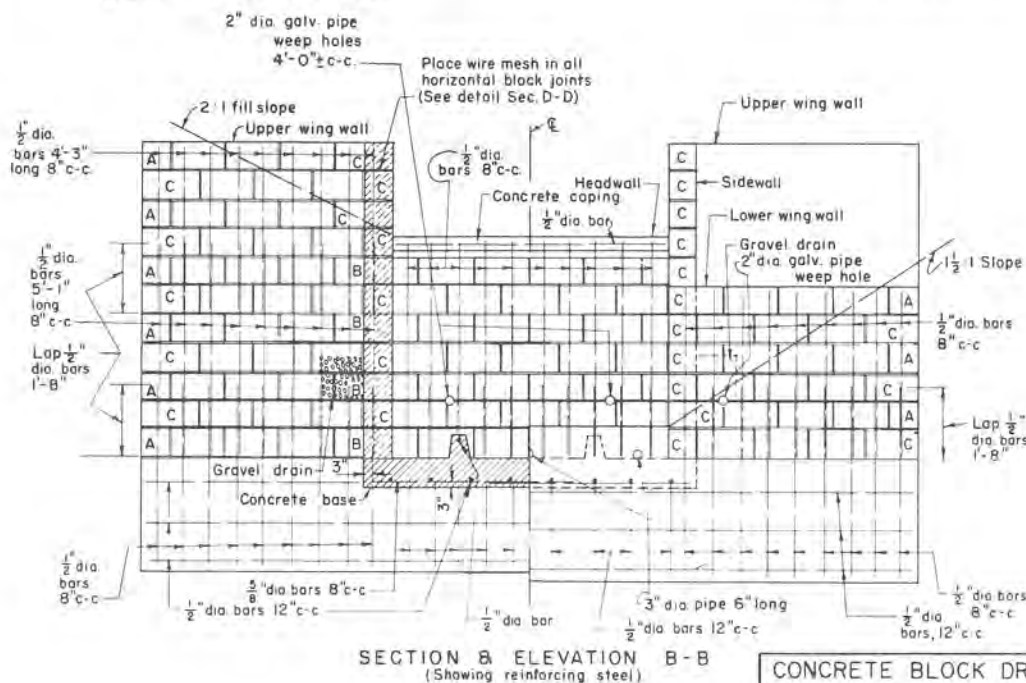
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		1-64	5,0-19,000.38-1



NOMENCLATURE	
H	Height of crest of spillway above top of end sill
d	Height of water surface above crest of spillway at design flow
W	Length of spillway crest
Q	Discharge in cubic feet per second
L	Longitudinal length of structure

Note: Concrete blocks marked A are half corner blocks 8" x 8" x 8". Concrete blocks marked B are half stretcher blocks 8" x 8" x 8". Concrete blocks marked C are corner blocks 8" x 8" x 16". Concrete blocks not marked are stretcher blocks 8" x 8" x 16".



# CONCRETE BLOCK DROP STRUCTURE FOR GULLY AND TERRACE OUTLET CONTROL

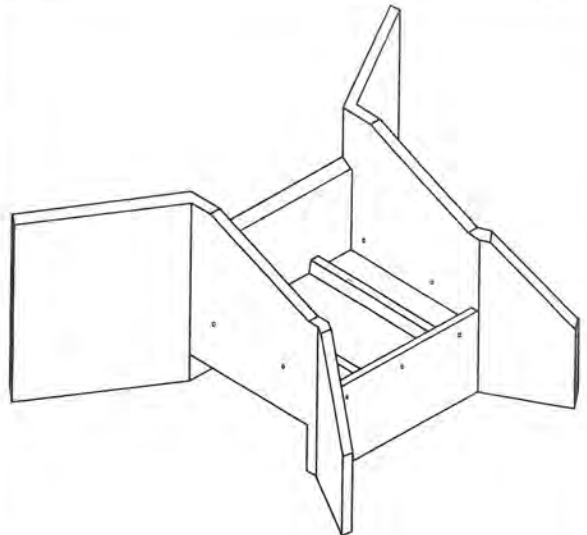
$H = 4' - 8\frac{1}{2}"$   $d = 2' - 0"$

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		1-64	5,0-19,000.38-1

TABLE No.2 - VERTICAL BAR SPACINGS & CUTOFFS  
FOR HEADWALL & SIDEWALLS

H	D <sub>1</sub>	HEADWALL VERT. BARS		SIDEWALL VERTICAL BARS 1/2" DIAM.				
		Spacing 1/2 dia. V <sub>1</sub> bars c-c	Cut off alternate bars "X" distance below top of headwall	V <sub>2</sub> No.	Bars Spacing c-c	V <sub>3</sub> No.	Bars Spacing c-c	Cut off alternate bars "Y" distance above top of floor slab if spa- cing does not ex- ceed 9" c.c. No cut off for greater spg.
1	2	3	4	5	6	7	8	9
3'-0"	1'-6"	12"	0	5	12"	0	0	0
	2'-0"	12"	0	6	12"	0	0	0
4'-0"	1'-6"	9"	1'-6"	4	10"	2	12"	0
	2'-0"	7"	1'-6"	7	8"	2	12"	3'-0"
	2'-6"	5 1/2"	1'-9"	9	5 1/2"	4	10"	3'-3"
	3'-0"	5 1/2"	1'-9"	9	5"	7	8"	3'-6"
5'-0"	1'-6"	5"	2'-0"	7	6"	2	12"	3'-0"
	2'-0"	5 1/2"	2'-0"	7	6"	5	9"	3'-3"
	2'-6"	4 1/2"	2'-3"	13	4 1/2"	5	9"	3'-6"
	3'-0"	4"	2'-3"	15	4 1/2"	5	9"	3'-6"



ISOMETRIC VIEW

TABLE No. 1 - DIMENSIONS AND QUANTITIES

DIMENSIONS								QUANTITIES			
H	D <sub>1</sub>	L <sub>1</sub>	L <sub>2</sub>	L <sub>3</sub>	D <sub>0</sub>	P	t	W = 6'-0"		Add for each additional foot in spill- way length (W) over W = 6'-0"	
								Concrete Cu. yds.	Reinforcing steel Pounds	Concrete Cu. yds.	Reinforcing steel Pounds
3'-0"	1'-6"	4'-0"	4'-6"	2'-6"	2'-0"	5"	6"	4.26	357	0.28	19
	2'-0"	5'-3"	5'-9"	3'-3"	2'-9"	6"	6"	5.23	450	0.32	23
4'-0"	1'-6"	4'-6"	4'-6"	2'-6"	2'-0"	5"	6"	4.83	414	0.32	23
	2'-0"	5'-9"	5'-9"	3'-3"	2'-9"	6"	6"	6.17	515	0.35	26
	2'-6"	7'-0"	7'-0"	3'-10"	3'-4"	9"	6"	7.78	680	0.40	31
	3'-0"	8'-0"	8'-0"	4'-6"	4'-0"	11"	7"	9.85	812	0.45	33
5'-0"	1'-6"	5'-0"	4'-6"	3'-2"	2'-8"	5"	6"	5.61	519	0.35	30
	2'-0"	6'-3"	5'-9"	3'-3"	2'-9"	6"	7"	7.26	587	0.41	32
	2'-6"	7'-6"	7'-0"	3'-10"	3'-4"	9"	7"	9.06	770	0.46	36
	3'-0"	8'-6"	8'-0"	4'-6"	4'-0"	11"	8"	11.44	933	0.52	40

NOTE:

Quantity of gravel required for drains back of sidewalls varies from 12 cu. feet for smallest structure listed in table to 21 cu. feet for largest.

NOTES:

- Reinforcement to be 1/2" dia. deformed bars, intermediate grade. Lap bars 20" at splices. All steel spacings not shown in table are 12" centers both ways. All horizontal bars are spaced at 12" centers. Longitudinal bars in floor slab to be bent into the toe wall and headwall as shown on plans. Vertical bars in sidewalls to be bent into floor slab a distance of 3'-0". Horizontal bars in headwall above bottom of floor to be bent into sidewalls a distance of 1'-0". Horizontal bars in upper wing walls above bottom of floor to be bent into sidewalls a distance of 2'-0". Horizontal bars in upper wing walls below bottom of floor to be bent into the cutoff wall a distance of 2'-0".
- Cutoff and toe walls to be poured against undisturbed earth where possible.
- Place three 2" dia. pipes through end sill with flow lines at the top of floor elevation. Place one pipe on centerline and one midway between each sidewall and longitudinal sill.
- Place 2" dia. weep holes spaced about 4'-0" c-c through sidewalls with flow line at same elevation as top of end sill.
- Place gravel drain back of sidewalls as shown on plans.
- Use construction joints when necessary formed with beveled 2 X 4's.

NOMENCLATURE

H	Height of crest of spillway above top of end sill
D <sub>1</sub>	Height of top of sidewall and upper wing wall above crest of spillway
D <sub>0</sub>	Height of lower end of sidewall above top of end sill
d	Height of water above crest of spillway at design flow
W	Length of spillway crest
L <sub>1</sub>	Distance between downstream face of headwall and upstream top edge of end sill
L <sub>2</sub>	Length of upper wing walls = $2.31 D_1 + 12" \pm$
L <sub>3</sub>	Length of lower wing walls = $D_0 + 6"$
t	Thickness of headwall and sidewalls
P	Height of end sill
X	Cutoff point from top of headwall for every other vertical bar in headwall
Y	Cutoff point above top of floor for every other vertical bar in sidewall when spacing does not exceed 9"
b	Distance inside face of sidewall to centerline of longitudinal sill
Q	Discharge in c. f. s.

TABLE OF SPILLWAY CAPACITIES IN C.F.S.

D <sub>1</sub>	LENGTH OF SPILLWAY OPENING "W" IN FEET						
	6	8	10	12	14	16	20
1'-6"	17.4	23.4	29.4	35.4	41.4	47.4	59.4
2'-0"	31.4	42.4	53.5	64.5	75.5	86.5	109.0
2'-6"	47.5	64.5	81.4	98.4	115.0	132.0	166.0
3'-0"	65.2	88.9	113.0	136.0	160.0	184.0	231.0

$d = D_1 - 6"$  freeboard  
Capacity of spillway  $Q = 3.0(W - 0.2d)d^{3/2}$  c. f. s.

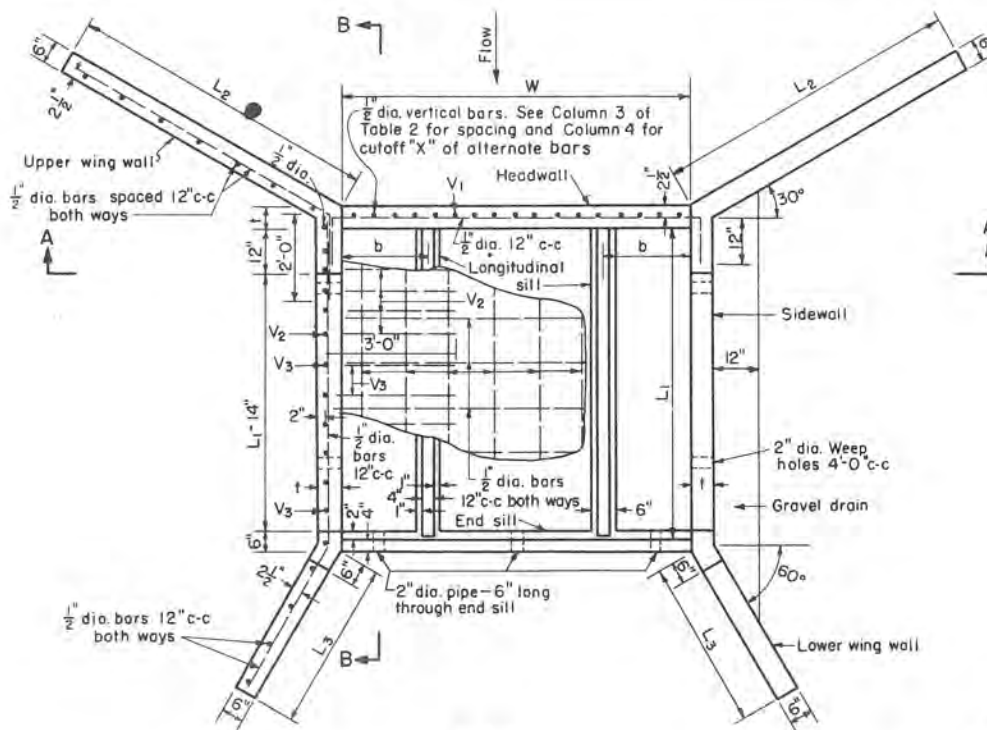
REINFORCED CONCRETE DROP STRUCTURE  
FOR GULLY AND TERRACE OUTLET CONTROL  
H = 3 to 5 Feet, inc.

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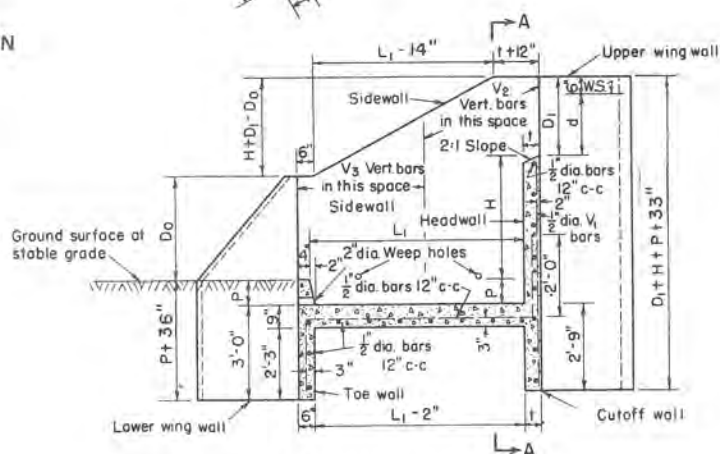
COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.39-1

(Rev. 8/64)

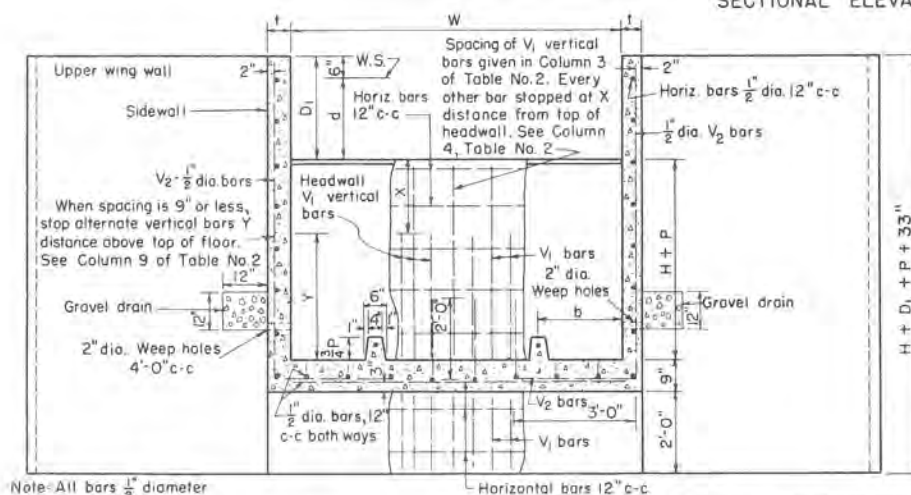




PLAN



SECTIONAL ELEVATION B-B



SECTIONAL ELEVATION A-A

REINFORCED CONCRETE DROP STRUCTURE  
FOR GULLY AND TERRACE OUTLET CONTROL  
H = 3 to 5 Feet, inc.

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COMPILED	CHECKED	DATE	DRAWING NO.
		1-64	5,0-19,000.39-1